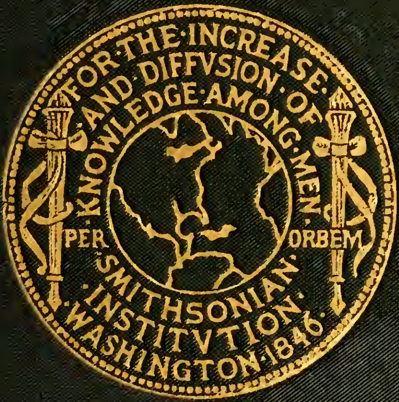
FOR THE INCREASE AND DIFFVSION OF KNOWLEDGE AMONG MEN
PER ORBEM
SMITHSONIAN INSTITVTION
WASHINGTON 1846

SHOUT
SHARE
IT

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
Bulletin 100
VOLUME 8

CONTRIBUTIONS TO THE BIOLOGY OF THE PHILIPPINE ARCHIPELAGO AND ADJACENT REGIONS

THE FISHES OF THE SERIES CAPRIFORMES, EPHIPPIFORMES, AND SQUAMIPENNES, COLLECTED BY THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS," CHIEFLY IN PHILIPPINE SEAS AND ADJACENT WATERS

BY

HENRY W. FOWLER
Of the Academy of Natural Sciences of Philadelphia
and
BARTON A. BEAN
Of the United States National Museum

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON
1929

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
U. S. GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
60 CENTS PER COPY

ADVERTISEMENT

The scientific publications of the National Museum include two series, known, respectively, as *Proceedings and Bulletin.*

The *Proceedings,* begun in 1878, is intended primarily as a medium for the publication of original papers, based on the collections of the National Museum, that set forth newly acquired facts in biology, anthropology, and geology, with descriptions of new forms and revisions of limited groups. Copies of each paper, in pamphlet form, are distributed as published to libraries and scientific organizations and to specialists and others interested in the different subjects. The dates at which these separate papers are published are recorded in the table of contents of each of the volumes.

The *Bulletins,* the first of which was issued in 1875, consist of a series of separate publications comprising monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, catalogues of type-specimens, special collections, and other material of similar nature. The majority of the volumes are octavo in size, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable. In the *Bulletin* series appear volumes under the heading *Contributions from the United States National Herbarium,* in octavo form, published by the National Museum since 1902, which contain papers relating to the botanical collections of the Museum.

The present work forms No. 100, volume 8, of the *Bulletin* series.

Alexander Wetmore,
Assistant Secretary, Smithsonian Institution.

Washington, D. C., December 13, 1928.

TABLE OF CONTENTS

	Page
List of illustrations	xi
Family Caproidae	2
Genus Antigonia	3
capros	3
eos	6
Family Scorpidae	6
Genus Scorpis	7
aequipinnis	7
lineolatus	8
lithophilus	8
violaceus	9
oblungus	9
georgianus	9
Genus Tilodon	9
australis	10
Genus Parascorpis	10
typus	10
Genus Doidyxodon	10
australis	11
Genus Atypichthys	11
strigatus	11
Genus Neatypus	11
obliquus	12
Family Monodactylidae	12
Genus Monodactylus	12
falciformis	13
argenteus	13
Genus Schuettea	16
scalaripinnis	17
Family Platacidae	17
Genus Platax	17
pinnatus	18
orbicularis	21
Family Ephippidae	24
Genus Ephippus	25
orbis	25
Genus Drepane	26
punctata	27
Family Toxotidae	29
Genus Toxotes	30
jaculator	30
oligolepis	32
chatareus	33
microlepis	33
carpentariensis	33
lorentzi	33
squamosus	34

Page

Family Scatophagidae 34
Genus Scatophagus 34
argus 35
Subgenus Desmoprenes 40
Scatophagus tetracanthus 40
Family Chaetodontidae 40
Genus Chelmo 42
rostratus 42
Genus Chelmonops 45
truncatus 45
Genus Forcipiger 45
longirostris 45
Genus Coradion 48
chrysozonus 49
melanopus 51
desmotes 51
Genus Parachaetodon 51
ocellatus 51
Genus Chaetodon 53
meyeri 60
ornatissimus 63
trifasciatus 65
melapterus 70
ephippium 70
bennetti 73
speculum 75
maculiceps 77
plebius 78
decoratus 78
semeion 79
blackburnii 80
leucopleura 81
leucopygus 81
howensis 81
daedalma 82
nippon 82
xanthocephalus 82
nigripinnatus 83
fremblii 83
flavirostris 83
mitratus 83
modestus 84
trichrous 84
corallicola 84
miliaris 85
citrinellus 86
quadrimaculatus 88
maculatus 88
guttatissimus 88
punctatofasciatus 89
notophthalmus 91
tricinctus 92
marleyi 92

Family Chaetodontidae—Continued.

Genus Chaetodon—Continued.

Page
aureofasciatus 92
rainfordi 93
octofasciatus 93
pelewensis 96
lunula 96
adiergastos 99
reinwardti 101
melannotus 101
collare 104
reticulatus 106
selene 108
ocellicauda 109
nigropunctatus 110
dayi 110
dahli 110
unimaculatus 110
melanopoma 112
kleinii 113
auriga 116
vagabundus 120
assarius 125
rafflesii 125
mertensii 127
argentatus 129
semilarvatus 130
fasciatus 130
lineolatus 130
oxycephalus 132
falcula 134
mesoleucos 136
triangulum 136
trifascialis 139
Genus Hemitaurichthys 142
zoster 142
thompsoni 143
Genus Microcanthus 143
strigatus 144
Genus Vinculum 145
sexfasciatus 146
Genus Heniochus 146
varius 147
monoceros 149
permutatus 151
singularius 152
acuminatus 154
Genus Holacanthus 156
lamarck 161
caudovittatus 162
melanospilus 162
xanthometopon 163
vroliki 164

Family Chaetodontidae—Continued.

Genus Holacanthus—Continued.

Page

trimaculatus 166
navarchus 167
xanthurus 169
diacanthus 169
flavissimus 172
bicolor 172
tibicen 174
nox 175
arcuatus 176
asfur 177
sexstriatus 177
loriculus 179
multifasciatus 179
bispinosus 181
potteri 183
multispinis 183
fisheri 183
lepidolepis 184
semicirculatus 185
chrysurus 188
nicobariensis 188
imperator 189
annularis 191
mesoleucus 191
septentrionalis 193
chrysocephalus 194
duboulayi 194
conspicillatus 194
melanosoma 195
dimidiatus 195
Family Zanclidae 195
Genus Zanclus 196
canescens 196
Family Hepatidae 199
Genus Ctenochaetus 200
strigosus 200
Genus Paracanthurus 205
theuthis 205
Genus Hepatus 207
fuliginosus 211
mindorensis 213
doreensis 213
mata 213
thompsoni 213
elongatus 213
leucopareius 214
chrysosoma 214
marginatus 214
philippinus 215
sohal 216
flavoguttatus 217

Family Hepatidae—Continued.

Genus Hepatus—Continued.

Page
lineatus ---- 217
undulatus ---- 219
bleekeri ---- 220
bariene ---- 222
grammoptilus ---- 225
lineolatus ---- 228
olivaceus ---- 231
pyroferus ---- 232
nigricans ---- 233
nigrofuscus ---- 237
maculiceps ---- 240
aterrimus ---- 243
leucosternon ---- 243
glaucopareius ---- 246
achilles ---- 247
guttatus ---- 248
triostegus ---- 249
Subgenus Harpurina ---- 253
Hepatus nubilus ---- 253
Genus Zebrasoma ---- 255
veliferum ---- 255
gemmatum ---- 258
flavescens ---- 258
xanthurum ---- 262
rostratum ---- 262
Genus Naso ---- 263
unicornis ---- 264
brachycentron ---- 268
brevirostris ---- 268
annulatus ---- 271
Subgenus Cyphomyeter ---- 273
Naso tuberosus ---- 273
eoume ---- 275
lituratus ---- 278
hexacanthus ---- 280
genimarginatus ---- 282
vomer ---- 282
tapeinosoma ---- 283
thynnoides ---- 285
punctulatus ---- 286
tripeltes ---- 287
Genus Prionurus ---- 287
microlepidotus ---- 287
Family Siganidae ---- 288
Genus Siganus ---- 288
javus ---- 291
concatenatus ---- 293
kopsii ---- 297
albopunctatus ---- 297
punctatissimus ---- 298
labyrinthodes ---- 299

Family Siganidae—Continued.

Genus Siganus—Continued.

Page
vermiculatus 299
corallinus 301
sutor 305
oramin 307
rostratus 310
tumifrons 311
canaliculatus 311
punctatus 312
guttatus 313
notostictus 314
stellatus 314
fuscescens 314
luridus 319
argenteus 319
lineatus 319
spinus 320
rivulatus 323
tetrazonus 324
doliatus 324
puellus 325
virgatus 327
vulpinus 332
Index 335

LIST OF ILLUSTRATIONS

Page
Fig. 1. Variation of color markings of Scatophagus argus (Linnaeus) 37
2. Rostral variation with age of Forcipiger longirostris (Broussonet) 47
3. Variation of color markings of Chaetodon meyeri Schneider 61
4. Variation of color markings of Chaetodon meyeri Schneider 62
5. Chaetodon ornatissimus Cuvier. Young 63
6. Variation of color markings of Chaetodon adiergastos Seale 100
7. Microcanthus strigatus Cuvier. Young 144
8. Variations in color markings of Holocanthus diacanthus (Boddaert) 170
9. Holacanthus nicobariensis (Schneider). Uppermost left figure. All others Holacanthus semicirculatus 186
10. Variation of color markings of Paracanthurus theuthis (Lacépède) 206
11. Hepatus philippinus (Herre) 215
12. Variation of color markings of Hepatus lineatus (Linnaeus) 218
13. Hepatus maculiceps Ahl 242
14. Hepatus leucosternon (Bennett) 245
15. Hepatus nubilus, new species 254
16. Rostral variation with age of Naso unicornis (Forskål) 265
17. Rostral variation with age of Naso brevirostris (Valenciennes) 269
18. Rostral variation with age of Naso annulatus (Quoy and Gaimard 271
19. Rostral variation with age of Naso tuberosus Lacépède 274
20. Rostral variation with age of Naso eoume (Lesson) 277
21. Rostral variation with age of Naso hexacanthus (Bleeker) 281
22. Naso vomer (Klunzinger). Adult 283
23. Rostral variation with age of Naso tapeinosoma (Bleeker) 284
24. Rostral variation with age of Naso thynnoides (Valenciennes) 285
25. Siganus punctatissimus, new species 298

THE FISHES OF THE SERIES CAPRIFORMES, EPHIPPIFORMES, AND SQUAMIPENNES, COLLECTED BY THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS," CHIEFLY IN PHILIPPINE SEAS AND ADJACENT WATERS

By Henry W. Fowler

Of the Academy of Natural Sciences of Philadelphia

and

Barton A. Bean

Of the United States National Museum

The spiny rayed fishes of the series Capriformes, Ephippiformes, and Squamipennes, as limited by Jordan, form the subject of this volume, which is the second devoted to the report on the fishes collected during the cruise of the United States Bureau of Fisheries steamer *Albatross* in Philippine seas and adjacent waters in 1907–1910. The first report, embracing the families Pomacentridae, Labridae, and Callyodontidae formed volume 7 of the present bulletin.

Under the Capriformes we unite the Antigonidae with the Caproidae, to include *Capros* and *Antigonia.* Though suggestive of the Zeidae they differ in the ventrals having one spine and five soft rays. Like the Squamipennes, both have the post-temporal solidly united with the skull. Both the Capriformes and the Zeidae differ from the Squamipennes in the gill membranes free from the isthmus.

The Ephippiformes include the Scorpidae, Monodactylidae, Platacidae, and Ephippidae, as we merge the Drepanidae with the last. They differ from both the Capriformes and the Squamipennes, likewise the Zeidae, in the post-temporal not joined solidly with the skull. They agree with the Squamipennes especially in their densely scaled bodies and fins and the lateral restriction of the gill openings.

The Squamipennes include the Toxotidae, Scatophagidae, Chaetodontidae, Zanclidae, Hepatidae, and Siganidae.

Though these groups have all been more or less loosely used, we have preferred simply to accept them without further detailed definition.

In the preface to the first report of the splendid work of the scientific staff of the *Albatross* during this cruise, consisting of Dr. Hugh

M. Smith, director of the expedition; F. M. Chamberlain, naturalist; Lewis Radcliffe, assistant naturalist; C. E. Wells, ship's clerk; and K. Ito, artist, was duly acknowledged. In this connection should also be mentioned the untiring assistance rendered by Dr. Paul Bartsch, who served as the representative of the United States National Musuem on board the *Albatross* during part of the cruise. The excellent preparation of the material is due to their efforts. The immense collections were obtained by dredging, seining, trapping, dynamiting the reefs, as well as by the use of submarine light at night and by purchase of market material. The color notes based upon the fresh specimens, in many instances supplemented by color sketches made by Mr. Ito, have been incorporated in the text and are cited with the field number of the tag attached to the specimen.

While all the materials collected by the United States steamer *Albatross* from 1907 to 1910 in the Philippines and East Indian region, representative of the above families, form the basis of this work, we have also examined the general series of material in the United States National Museum pertaining to the same limits. Many of these fishes early attracted the pioneer voyagers and naturlists, so that many have long been known to science. It therefore follows that we have very few to report as new. The following are the few new taxonomic units.

Desmoprenes, new subgenus, under *Scatophagus*.
Harpurina, new subgenus, under *Hepatus*.
Hepatus nubilis, new species.
Cyphomycter, new subgenus, under *Naso*.
Siganus punctatissimus, new species.

Besides the species represented in the above collections, we have also included all those described or reported from the entire Indo-Pacific region. For these only regional and other important or distributional references are given, besides a condensed account, duly credited. As the hepatids and siganids were not included in Bleeker's unfinished Atlas we have given all his important references so far as we could locate them.

Besides the figures of the few new species are a number of others portraying the variation of some of the more striking individuals with reference to color designs. These are by Henry W. Fowler. We are indebted to Earl D. Reid for copying the data of a number of specimens.

Family CAPROIDAE

Body compressed, deep, back elevated. Head small. Snout short. Eye moderate. Mouth moderately small, lower jaw protruding. Teeth very small, slender. Premaxillaries very protractile, hind processes very long. Opercle small. Top of head bony.

Preopercle and preorbital more or less serrated. Gills normal. Gill membranes separate, free from isthmus. Vertebrae 23, of which 13 caudal. Scales small, ctenoid, extend on sides of head. Lateral line not extending on caudal. Dorsal long, stout spines separated from soft rays by deep notch, spines not graduated. Anal spines 3, separated by notch from soft rays, first spine longest. Soft dorsal and anal alike. Caudal rounded, peduncle moderate. Ventral with strong spine and 5 rays, inserted below pectorals.

Genera 3, the extinct *Metoponichthys* Kramberger = *Proantigonia* Kramberger said to be intermediate. The few recent species of wide distribution and living at moderate depths. The Atlantic *Capros* Lacépède differs from *Antigonia* in its very protractile mouth.

Genus ANTIGONIA Lowe

Antigonia Lowe, Proc. Zool. Soc. London, vol. 2, 1843, p. 85. Type *Antigonia capros* Lowe, monotypic.

Hypsinotus Schlegel, Fauna Japon., Poiss., dec. v–vi, 1844, p. 84, pl. 42, fig. 2. Atypic. Type *Hypsinotus rubescens* Günther.

Caprophonus Müller and Troschel, Horae Ichth. Zool., vol. 3, 1845, p. 28. Type *Caprophonus aurora* Müller and Troschel, monotypic.

Body greatly elevated, much deeper than long, very greatly compressed. Upper profile of head to dorsal very steep, almost straight. Mouth small, cleft nearly vertical. Mandible protrudes. Teeth in jaws uniserial, slender, small, none on palate. Cheek deep. Opercle short. Surface of head above with rough bony striae, preopercle and suborbital with slender, antrorse spines. Branchiostegals 6. Scales moderate, firm, rough ctenoid, present on maxillary, cheek, and opercle. Lateral line concurrent with back. Third dorsal spine stout, elevated, sixth or last shortest, lower than rays. Anal spines with first longest. Soft dorsal and anal long and low. Caudal short, truncate. Pectoral moderate. Ventral strong, moderate, lowest in ventral outline, large spine roughened in front.

Species of moderate size and pale red coloration living in moderate depths. They appear to have been unduly multiplied as our materials show a great range of variation. Likely all are referable to but two or three species.

ANTIGONIA CAPROS Lowe

Antigonia capros Lowe, Proc. Zool. Soc. London, vol. 2, 1843, p. 85. Madeira.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 497 (copied).—Steindachner, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 41, Heft 1, 1879, p. 10 (Yokohama).—Steindachner and Döderlein, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 49, abth. 1, 1885, p. 187, pl. 5 (Tokyo).—Günther, Rep. Voy. Challenger, vol. 22, 1887, p. 44 (Madeira, Barbados, Manado, Ki Islands, in 129 fathoms).—Goode and Bean, Ocean. Ichth., 1896, p. 229, fig. 235 (copied).—Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, 1896, p. 316 (off Ceylon in 296 to 320 fathoms).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 41 —

Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 250 (Natal coast in 40 fathoms).

Caprophonus aurora Müller and Troschel, Horae Ichth. Zool., vol. 3, 1849, p. 28, pl. 5, fig. 1. Barbados.

Hypsinotus benhalatute Bleeker, Verh. Batav. Genootsch. (Nal. Ich. Japan), vol. 25, 1853, p. 13. Oomura, Japan. (No description or figure.) (On *Hypsinotus* Schlegel.)

Hypsinotus rubescens Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 63 (on *Hypsinotus* Schlegel, Fauna Japon., Poiss., dec. v–vi, 1844, p. 84, pl. 42, fig. 2, Nagasaki).—Günther, Rep. Voy. Challenger, vol. 1, 1880, p. 44 (Japan, Celebes, Ki Island).—Meyer, An. Soc. Española Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Manado, Celebes).

Antigonia rubescens Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 523 fig. 2 (Suruga Bay, Totomi Bay, Misaki, in 34 to 64 fathoms).—Weber, Siboga Exp., vol. 57, Fische 1913, p. 299 (Arafura Sea, in 204 to 304 m).—Gilchrist, South Afric. Fisher. Marine Biol. Surv., No. 2, 1921 (1922), p. 74 (west coast of South Africa).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 1, June 1925, p. 380, pl. 16, fig. 2 (Natal).

Antigonia mülleri Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 380, pl. 5, fig. 3. "Neu Seeland."

Antigonia steindachneri (Jordan and Evermann) Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 522. Hilo, Kailua, and Honolulu, Hawaiian Islands.—Jordan and Evermann, Bull. U. S. Fish. Comm., vol. 23, pt. 1, 1903 (1905), p. 361, pl. 45 (Kailua and Hilo).

Antigonia malayana Weber, Siboga Exp., vol. 57, Fische 1913, p. 299, fig. 69. Arafura Sea (5° 28′.4 S. B., 132° 0′.2 O. L., in 204 m.; 5.9° 48′.2 S. B., 132° 13′ O. L., in 304 m.).

Antigonia fowleri Franz, Abh. Bayer. Akad. Wiss., Heft 4 (1), 1910, p. 54. Sagami Bay, Dyushi, Misaki, Aburatsubo.

Antigonia rubicunda Ogilby, Proc. Roy. Soc. Queensland, vol. 22, 1910, p. 103. Off North Reef, Queensland.—McCulloch, Rep. Fish. Endeavour, pt. 3, April 21, 1915, p. 113, pl. 18, fig. 2 (13 miles N. 50° east of North Reef, Queensland, in 70 fathoms).

Antigonia rhomboidea McCulloch, Rep. Fish. Endeavour, pt. 3, April 21, 1915, p. 111, pl. 18, fig. 1. Between Gabo Island and Cape Everard, Victoria, in 200 to 250 fathoms.

Depth 1 to 1⅕, greater than length in young; head 2½ to 2⅗, width 2 to 2⅙. Snout 3 to 3⅓ in head from snout tip; eye 2⅖ to 2½, greater than snout or interorbital; maxillary ⅖ to ½ in snout, 3½ to 3⅘ in head; interorbital 3⅓ to 4, broadly convex. Gill rakers 5 + 14, lanceolate, short, 3½ in gill filaments, which 1⅘ in eye.

Tubes 52 to 60 in lateral line to caudal base; 15 scales above lateral line, 43 or 44 scales below. Scales with single row of 19 to 30 apical marginal spines and median linear cluster of 5 or as 6, 4, 2, and mostly bifid with age; circuli basal and fine.

D. VIII to X, 24, i to 29, i, third spine 1⅙ to 2 in total head length, third ray 3 to 4; A. III, 23, i to 26, i, first spine 2 to 3; least depth of caudal peduncle 2⅞ to 3⅛; caudal rounded behind to truncate with age, also rounded in adult when expanded, 1¾ to 1⅞; pectoral 1⅛ to 1⅖; ventral spine 1¼ to 1¾.

Largely uniform dull or light brown, with silvery shades, especially about peritoneum, which shows through body walls whitish. Sides of head and iris whitish.

Besides widely distributed in the Atlantic, where it has been reported from Barbadoes, Azores, Ascension Island and Madeira, it is widely distributed in the Indo-Pacific, Natal, Ceylon, East Indies, Queensland, Victoria, Japan, Hawaii.

10054. Balikias Bay, Lubang Island. July 17, 1908. Length 35 mm. (D. 5277)

2794 and 2795 (D. 5353). Cape Melville Light. January 1, 1909. Length 94 to 104 mm.

2099 (D. 5354). Cape Melville Light. January 1, 1909. Length 78 mm.

Nineteen examples (D. 5403). Capitancillo Light. March 16, 1909. Length 55 to 90 mm. Some quite rough on head.

3307 to 3310, 5883 (D. 5403). Capitancillo Light. March 16, 1909. Length 91 to 101 mm.

1694 to 1698, 1700, 2498 (D. 5408). Capitancillo Light. March 18, 1909. Length 60 to 101 mm.

8404, 17861 and 17862 (D. 5409). Capitancillo Light. March 18, 1909. Length 97 to 130 mm.

2495 to 2498 (D. 5273). Corregidor Light. July 14, 1908. Length 53 to 60 mm.

1545 to 1547 (D. 5418). Louis Point Light. March 25, 1909. Length 83 to 93 mm.

10128 (D. 5501). Macabalan Point Light, Mindanao. August 4, 1909. Length 133 mm.

2548 and 2549 (D. 5121). Malabrigo Light. February 2, 1908. Length 67 to 74 mm.

3235 to 3237 (D. 5279). Malavatuan Island. July 17, 1909. Length 51 to 63 mm.

10021 (D. 5278). Malavatuan Island. July 17, 1909. Length 57 mm.

5844 (D. 5168). Observation Island. February 25, 1908. Length 38 mm.

2073 [1361] (D. 5397). Panalangan Point, Talajit Island. March 15, 1909. Length 70 mm.

10168. Philippines. Length 97 mm.

5845 (D. 5768?). Philippines. February 25, 1908. Length 35 mm.

10133 to 10135 (D. 5519). Point Tagolo Light. August 9, 1909. Length 109 to 141 mm.

3413 to 3416, 3433 (D. 5520). Point Tagolo Light. August 10, 1909. Length 58 to 66 mm.

(D. 5518). 3 examples. Point Tagolo Light. August 9, 1909. Length 117 to 133 mm.

1365 (D. 5179). Romblon Light. April 9, 1908. Length 112 mm.

2912 and 2913 (D. 5372). Tayabas Light (outer). February 24, 1909. Length 42 to 57 mm.

3140 (D. 5375). Tayabas Light. March 2, 1909. Length 51 mm.

3726 to 3729 (D. 5371). Tayabas Light (outer). February 24, 1909. Length 33 to 53 mm.

4022 to 4024 (D. 5369). Tayabas Light (outer). February 24, 1909. Length 37 to 58 mm.

50803 U.S.N.M. Suruga Bay, Japan. *Albatross* collection. Length 155 mm.

50804 U.S.N.M. Totomi Bay. *Albatross* collection. Length 52 to 103 mm. Six examples.

51030 U.S.N.M. Hawaii. Bureau of Fisheries. Adult.

57588 U.S.N.M. Japan. P. L. Jouy. Length 96 to 104 mm. Two examples.
75465 U.S.N.M. Misaki, Japan. Length 36 to 82 mm. Eight examples. All these Japanese specimens reported as *Antigonia rubescens.*
9646. Gulf of Boni, Celebes. December 16, 1909. Length 34 mm. (D. 5645).

ANTIGONIA EOS Gilbert

Antigonia eos Gilbert, Bull. U.S. Fish. Comm., vol. 23, pt. 2, 1903 (1905), p. 621, pl. 80, fig. 1. Pailolo Channel, Hawaii, in 122 to 132 fathoms.

Differs from *Antigonia capros* in the greatly longer dorsal spines which are about half length of combined head and body or at least longer than head.

We have examined the following:

51593 U.S.N.M. Hawaii. *Albatross* collection. Type.
51685 U.S.N.M. Hawaii. *Albatross* collection.
51686 U.S.N.M. Hawaii. *Albatross* collection. Length 33 to 77 mm. Seven examples. Paratypes.

Family SCORPIDAE

Body strongly compressed, usually moderately deep, ovate to nearly orbicular. Snout moderate. Mouth cleft moderate or small. Maxillary sometimes well exposed, without supplemental bone. Jaws with bands of teeth, outer row at least enlarged, sometimes incisor-like. Minute teeth on palate usually. Preopercle serrated or denticulate. Gill openings lateral. Gill rakers lanceolate. Pseudobranchiae present. Branchiostegals 7. Air bladder present. Vertebrae 25, of which 15 caudal. Pyloric appendages numerous or moderate. Scales usually small and ctenoid, cover body and most of head, usually cover soft parts of vertical fins. Lateral line complete. Dorsal with 9 to 15 spines, usually graduated to last which longest; rays 11 to 30. Anal with 3 spines and 10 to 30 rays. Caudal lunate, or sometimes double concave. Paired fins rather small; ventral with spine and 5 rays.

Eastern Pacific, Southern Africa and Australia. Besides the genera of the Indo-Pacific region are the American *Medialuna* Jordan and Fesler and *Parapsettus* Steindachner.

ANALYSIS OF THE GENERA

*a*¹. Coloration largely uniform, at least without longitudinal or oblique dark bands.
  *b*¹. Fins more or less scaled, at least soft vertical fins.
    *c*¹. Caudal well forked.
      *d*¹. All dorsal spines joined by membranes; dorsal spines graduated to last, which longest, lower than first dorsal rays; pectoral longer than ventral; mouth moderate. **Scorpis**
      *d*². First 6 dorsal spines free, only last 3 joined by membrane; scales small, about 100---------------------------------------**Tilodon**
    *c*². Caudal but feebly notched behind; D. XII, 15; scales 130. **Parascorpis**

b^2. Fins scaleless; scales 53 to 55; D. XV, 11; A. III, 10-------**Doidyxodon**

a^2. Coloration variegated, with dark horizontal or oblique bands; mouth very small.

e^1. Band of villiform teeth in each jaw; spinous dorsal and anal scaleless--**Atypichthys**

e^2. Broad band of trilobate movable teeth in each jaw; spinous dorsal and anal scaly--------------------------**Neatypus**

Genus SCORPIS Valenciennes

Scorpis Valenciennes, Hist. Nat. Poiss., vol. 8, 1831, p. 503. Type *Scorpis georgianus* Valenciennes, monotypic.

Agenor Castelnau, Proc. Linn. Soc. New South Wales, vol. 3, 1879, p. 371. Type *Agenor modestus* Castelnau, monotypic.

Leptotichthys Hutton, Trans. New Zealand Inst., vol. 22, 1889 (1890), p. 270. Type *Ditrema violaceus* Hutton, monotypic.

Caesiosoma Kaup, Nederland. Tijdschr. Dierk., vol. 1, 1864, p. 161. Atypic. Type *Caesiosoma sieboldi* Bleeker.

Body more or less elevated or oblong ovate. Mouth moderate, maxillary rather short and exposed. Jaws with bands of teeth, outer series more or less enlarged; patches of minute teeth on vomer, palatines, pterygoids and tongue. Preopercle serrated. Body and most of head covered with rather small ctenoid scales. Soft vertical fins scaly and spinous portion with scaly sheath. Dorsals continuous, with 9 or 10 spines graduated to last, which longest and rays 24 to 30. Anal spines 3, rays 24 to 30.

Species mostly Australian. The following is largely from McCulloch.

ANALYSIS OF THE SPECIES

a^1. Agenor. Body more slender, depth half or less than half its length; soft dorsal and anal not or only slightly produced anteriorly; no dark cross bands.

b^1. Dorsal and anal rays of about equal number.

c^1. Scales smaller, more than 100 along above lateral line; maxillary expansion wide as interspace to eye--------------------**aequipinnis**

c^2. Scales larger, less than 100 along above lateral line; maxillary expansion wider than interspace to eye.

d^1. Anal rays equal or more numerous than dorsal; interorbital space less convex; eye larger.

e^1. Dorsal rays 25 to 27, anal 27 to 29------------------**lineolatus**

e^2. Dorsal rays 20, anal 23 or 24-----------------------**lithophilus**

d^2. Anal rays fewer than dorsal; interorbital very convex; eye smaller---**violaceus**

b^2. Dorsal rays 30, anal 23----------------------------------**oblungus**

a^2. Scorpis. Body deeper, depth over half length; soft dorsal and anal strongly produced anteriorly; body with 2 broad dark cross bands. **georgianus**

SCORPIS AEQUIPINNIS Richardson

Scorpis aequipinnis Richardson, Voy. Erebus and Terror, Ichth., 1844–48, p. 121. King George's Sound, Australia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 64 (Swan River, type); Ann. Mag. Nat. Hist., ser. 3, vol. 20, 1867, p. 58 (Swan River, King George's Sound).—McCulloch, Rec. Australian Mus., vol. 11, No. 7, 1917, p. 177, fig. 2 (Freemantle and Adelaide).

Scales very fine, especially on head and breast. Ends of dorsal spines only slightly free from scaly base. Soft dorsal and anal with slight though distinct anterior lobe. Reaches 323 mm. according to McCulloch. South and South-western Australia.

SCORPIS LINEOLATUS Kner

Scorpis lineolatus KNER, Reise Novara, Fische, 1865, p. 108, pl. 5, fig. 3. Sydney.—MCCULLOCH, Rec. Australian Mus., vol. 11, No. 7, 1917, p. 178 (New South Wales); Australian Zool., vol. 2, pt. 3, 1922, p. 90, pl. 26, fig. 227*a* (New South Wales).

Scorpis aequipinnis (not RICHARDSON) GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 64 (Port Jackson).—BLEEKER, Nat. Tijdschr. Dierk., vol. 2, 1865, p. 70 (Port Jackson).—STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 53, Heft 1, 1866, p. 436 (Port Jackson); vol. 56, Heft 1, 1867, p. 334 (Port Jackson).—GÜNTHER, Ann. Mag. Nat. Hist., ser. 3, vol. 20, 1867, p. 58 (New South Wales and Sydney).—CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 3, 1879, p. 376 (Port Jackson).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 397 (Port Jackson).—OGILBY, Cat. Fish. New South Wales, 1886, p. 17; Edible Fish New South Wales, 1893, p. 38, pl. 10.—KENT, Great Barrier Reef, 1893, p. 369, (Queensland).—WAITE, Mem. New South Wales Nat. Club, 1904, p. 35.—STEAD, Edible Fish New South Wales, 1908, p. 79.—FOWLER, Proc. Acad. Nat. Sci., Philadelphia, 1923, p. 44 (Melbourne).

Caesiosoma aequipinnis WAITE, Mem. Australian Mus., vol. 4, pt. 1, 1899, p. 84 (Schnapper Rock and Young Bucks).—OGILBY, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 25 (off Moreton Bay).—WAITE, Rec. Australian Mus., vol. 5, pt. 3, 1904, p. 167 (Lord Howe Island).

Scorpis richardsonii STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 53, Heft 1, 1866, p. 437, pl. 5, fig. 1. Port Jackson.

Agenor modestus CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 3, 1879, pp. 350, 371. Port Jackson.—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 368 (Port Jackson).—OGILBY, Cat. Fish. New South Wales, 1886, p. 12.—VAILLANT, Bull. Mus. Hist. Nat. Paris, vol. 3, 1897, p. 86 (type).

Scales about 90 along lateral line. Scales on head and breast moderate. Dorsal rays 25 to 27, anal 27 to 29. New South Wales, Victoria, and Southern Queensland.

The example, an adult, reported by Fowler from Victoria is evidently this species, though has spoiled so as not to be available for further examination.

59880 U.S.N.M. Port Jackson, New South Wales. D. G. Stead. Six examples. Length 100 to 122 mm.

29001 U.S.N.M. North Mount Maclay. Australian Museum. Length 332 mm.

47843 U.S.N.M. Deliniquin. Australian Museum. Two examples. Length 143 to 160? mm.

SCORPIS LITHOPHILUS Gilchrist and Thompson

Scorpis lithophilus GILCHRIST and THOMPSON, Ann. South Afr. Mus., vol. 6, 1908, p. 162. Natal.—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 663, pl. 28, fig. 1 (Natal).

Scales 90 to 95. Dorsal VIII, 20; anal III, 23 or 24. Length, 260 mm.

SCORPIS VIOLACEUS (Hutton)

Ditrema violacea Hutton, Trans. New Zealand Inst., vol. 5, 1873, p. 261, pl. 8, fig. 31*b*. Wellington.

Neptotichthys violaceus Hutton, Trans. New Zealand Inst., vol. 22, 1889 (1890), p. 278 (note).—Waite, Proc. Linn. Soc. New South Wales, vol. 22, 1897 (1898), p. 685 (Sydney, Port Jackson).

Scorpis violaceus Waite, Mem. New South Wales Nat. Club, 1904, p. 35.—McCulloch, Rec. Australian Mus., vol. 11, No. 7, 1917, p. 179 (Norfolk and Lord Howe Islands).

Scales about 89 along lateral line. Dorsal rays 27 to 29, anal 25 to 27. According to McCulloch, it is further separated from *Scorpis lineolatus* in the much more convex profile of the head. Reaches 230 mm. New Zealand, Norfolk Island, Lord Howe Island, New South Wales.

SCORPIS OBLUNGUS Canestrini

Scorpis oblungus Canestrini, Arch. Zool. Anat. Fisiol., ser. 2, vol. 1, 1869, p. 153. Australia.—McCulloch, Rec. Australian Mus., vol. 11, No. 7, 1917, p. 180 (copied).

Depth 3; head 4. Eye 3⅘ in head. D. IX, 30; A. III, 23. Dorsal and anal not elevated anteriorly. Back brown, silvery below. (Canestrini.)

SCORPIS GEORGIANUS Valenciennes

Scorpis georgianus Valenciennes, Hist. Nat. Poiss., vol. 8, 1831, p. 503, pl. 245. Port King George, Australia.—Richardson, Voy. Erebus and Terror, Ichth., 1844–48, p. 121 (copied).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 64 (Australia).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 364 (King George's Sound).—Macleay, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 397 (King George's Sound).—Johnston, Proc. Roy. Soc. Tasmania, 1882 (1883), p. 111; and 1890 (1891), p. 30.—Waite, Rec. Australian Mus., vol. 6, pt. 2, 1905, p. 64 (Mandurah).—McCulloch, Rec. Australian Mus., vol. 11, No. 7, 1917, p. 176 (Albany and Freemantle, southwest Australia).

Scales about 85 along lateral line. Dorsal spines rather short, well graduated up to last. Soft dorsal and anal with rather high anterior lobes, at least ¾ base of either fin. Brown, with 2 dark broad diffuse cross bands on back. Reaches 277 mm., according to McCulloch. South-western Australia, Tasmania?

Genus TILODON Thominot

Tilodon (Guichenot) Thominot, Bull. Soc. Philomath. Paris, ser. 7, vol. 5, 1881, p. 140. Type *Tilodon australis* (Guichenot) Thominot, monotypic.

Body elongate, elevated, compressed. Front profile concave. Snout obtuse. Teeth long and fine in both jaws. Preopercle denticulate, not spinous. Scales small, finely ciliated. Dorsals continuous, first 6 spines free and remaining 3 joined. Soft and vertical fins scaled nearly to edges.

TILODON AUSTRALIS Thominot

Tilodon australis (Guichenot) Thominot, Bull. Soc. Philomath. Paris, ser. 7, vol. 5, 1881, p. 140. Australia.

Depth 2⅕; head 4. Snout moderate, nearly long as eye, which 3⅓ in head. Lower jaw longer. Teeth in jaws filiform, in crescentic patch on palate. Scales 100 in lateral line, 21 above, 40 to 45 below. D. IX, 20; A. III, 18, fin round and entirely scaled; P. I, 13; V. I, 5. Brown. Brown circle around eye, descends on cheek and ends at thorax. Also 5 brown bands, broad, inclined in same manner. Band at caudal base. Length 410 mm. (Thominot.)

Genus PARASCORPIS Bleeker

Parascorpis Bleeker, Arch. Néerland. Sci. Nat. Haarlem, vol. 10, 1875, p. 380. Type *Parascorpis typus* Bleeker, monotypic.

Atyposoma Boulenger, Ann. South African Mus., vol. 1, 1899, p. 379. Type *Atyposoma gurneyi* Boulenger, monotypic.

Differs from *Atyposoma* in the presence of an opercular spine and spinous dorsal longer basally than soft dorsal.

Although placed with the Serranidae by Boulenger we have followed Jordan in associating it with the present family.

PARASCORPIS TYPUS Bleeker

Parascorpis typus Bleeker, Arch. Néerland. Sci. Nat. Haarlem, vol. 10, 1875, p. 381, pl. 7. Cape of Good Hope.—Boulenger, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 145 (copied).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 664 (South Africa and type of *Atyposoma gurneyi*).

Atyposoma gurneyi Boulenger, Ann. South African Mus., vol. 1, 1899, p. 379, pl. 9. False Bay, Cape of Good Hope.

Depth 2⅓; head 2⅔. Snout 3¾ in head from snout tip; eye 4¾, slightly less than snout. Maxillary reaches opposite hind eye edge, expansion 1⅓ in eye. Villiform teeth in jaws and on palate. Preopercle finely serrated. Scales very small, 130 in lateral line, pores 40, 20 scales above, 55 below. Head and soft vertical fins finely scaled. D. XII, 15; A. III, 14; median spines longer, little higher than soft rays. Caudal emarginate. Paired fins subequal, 1⅔ in head. Uniform brown. Length 193 mm. (Bleeker.)

Genus DOIDYXODON Thominot

Doidyxodon (Guichenot) Thominot, Bull. Soc. Philomath. Paris, ser. 7 vol. 5, 1881, p. 143. Type *Doidyxodon australis* (Guichenot) Thominot monotypic. [*Doydixodon* Valenciennes not involved.]

Teeth trenchant, curved, biserial, besides inner villiform band. Palate edentulous? Preopercle edge finely dentate. Cheeks scaled. Fins scaleless. Scales on body ciliated.

DOIDYXODON AUSTRALIS Thominot

Doidyxodon australis (GUICHENOT) THOMINOT, Bull. Soc. Philomath. Paris, ser. 7, vol. 5, 1881, p. 143. Australia.

Depth 2; head 4. Snout equals interorbital. Eye long as fourth dorsal spine. Upper jaw little protractile. Scales 53 to 55 in lateral line, 9 above, 20 to 22 below, and 9 rows on cheek. D. XV, 11; A. III, 10; P. 17; V. I, 5. Brownish. Length 360 mm. (Thominot.)

Genus ATYPICHTHYS Günther

Atypichthys GÜNTHER, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 510. Type *Atypus strigatus* GÜNTHER, virtually (as *Atypichthys* GÜNTHER proposed to replace *Atypus* GÜNTHER).

Atypus (not LATREILLE 1804) GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 64. Type *Atypus strigatus* GÜNTHER, monotypic.

Helotosoma KAUP, Nederland. Tijds. Dierk., vol. 1, 1863, p. 162. Type *Helotosoma servus* KAUP, monotypic.

Body compressed, oblong. Snout rather short. Mouth cleft small, jaws equal. Villiform teeth in jaws and on vomer, none on palatines. Preopercle denticulated. Air bladder bifurcate anteriorly and posteriorly. Pyloric appendages 11. Scales rather small, ctenoid, envelop soft vertical fins. One dorsal with 11 spines, anal with 3.

ATYPICHTHYS STRIGATUS (Günther)

Atypus strigatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 64. Swan River, Holdfast Bay, Australia, Raoul Island.—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 398 (Port Jackson and Swan River).

Atypichthys strigatus OGILBY, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 25 (off Cape Moreton).—MCCULLOCH, Biol. Res. Endeavour, vol. 4, pt. 4, 1916, p. 188 (off Sandon Bluff, New South Wales, 35 to 40 fathoms; off Cape Moreton, Queensland, 49–51 fathoms); Australian Zool., vol. 2, pt. 3, 1922, p. 90, pl. 26, fig. 228*a* (New South Wales).

Readily known by the presence of 5 or 6 dark longitudinal bands, especially on the back and wider than the interspaces. According to McCulloch reaches 254 mm. Queensland, New South Wales, Raoul Island.

59981 U.S.N.M. Port Jackson. D. G. Stead. 3 examples. Length 85 to 128 mm.

48809 U.S.N.M. Port Jackson. J. D. Ogilby. 3 examples. Length 107 to 120 mm.

59941 U.S.N.M. Port Jackson. D. G. Stead. 3 examples. Length 121 to 127 mm.

84372 U.S.N.M. Lord Howe Island. Length 350 mm.

Genus NEATYPUS Waite

Neatypus WAITE, Rec. Australian Mus., vol. 6, pt. 2. 1905, p. 64. Type *Neatypus obliquus* WAITE, monotypic.

Body and head compressed. Mouth small, transverse, slightly protractile. Maxillary small. Palate toothless. Scales moderate, finely ciliated, irregular. Lateral line complete. Spinous dorsal and anal with broad scaly bases, also soft vertical fins scaled. Apparently unique in its dentition.

NEATYPUS OBLIQUUS Waite

Neatypus obliquus Waite, Rec. Australian Mus., vol. 6, pt. 2, 1905, p. 65, pl. 10. Houtman's Abrolhos.—McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, 1916, p. 188 (between Cape Naturaliste and Geraldton, West Australia).

D. X, 22; A. III, 18; scales 51 in lateral line.

Readily known by its dark oblique bands, 6 in number, sloping down from back and head above posteriorly. Reaches 152 mm. Western Australia.

Family MONODACTYLIDAE

Palate with teeth. Nostrils double each side. Gill membranes free from isthmus. Branchiostegals 6 or 7. Lower pharyngeals separate. Subocular shelf present. Ribs all sessile, inserted behind transverse processes when these present. Spinous dorsal much reduced. Anal spines 3. Ventrals rudimentary or absent.

Shore fishes of Africa, Southern Asia, and Australasia. A few enter tropical rivers.

ANALYSIS OF THE GENERA

a^1. Dorsal spines 8; scales finely ctenoid ---------------------- **Monodactylus**
a^2. Dorsal spines 5; scales cycloid -------------------------------- **Schuettea**

Genus MONODACTYLUS Lacépède

Monodactylus Lacépède, Hist. Nat. Poiss., vol. 3, 1802, p. 131. Type *Monodactylus falciformis* Lacépède, monotypic.

Centropodus Lacépède, Hist. Nat. Poiss., vol. 3, 1802, p. 303. Type *Scomber rhombeus* Forskål, monotypic.

Acanthopodus Lacépède, Hist. Nat. Poiss., vol. 4, 1803, p. 558. Type *Chaetodon argenteus* Linnaeus, designated by Jordan and Evermann, Genera of Fishes, pt. 1, 1917, p. 64.

Psettus (not Klein 1775) (Commerson) Cuvier, Règne Animal, vol. 2, 1817, p. 336. Type *Scomber rhombeus* Forskål, designated by Jordan and Evermann, Genera of Fishes, pt. 1, 1917, p. 64.

Stromatoidea Castelnau, Mem. Poiss. Afriq. Australe, 1861, p. 44. Type *Stromatoidea layardi* Castelnau, monotypic.

Psettias (Jordan) Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 236. Type *Psettus sebae* Valenciennes, orthotypic.

Body very deep, strongly compressed. Mouth moderate, protractile. Maxillary exposed. Villiform teeth in jaws, on vomer, palatines and tongue. Pseudobranchiae large. Branchiostegals 6. Vertebrae 23 or 24 (=9 or 10+14). Air bladder bifurcate behind. Scales very small, ctenoid. Lateral line complete. Dorsal and anal elongate, thickly scaled, former with 7 or 8 and latter with 3 spines; front spines short and isolated, hind spines elongate, with only tips protruding from scaly skin. Ventrals very small or rudimentary, below pectorals.

Africa, Southern Asia, and Australia. Three species known, the following and *Monodactylus sebae* from West Africa.

ANALYSIS OF THE SPECIES

a^1. Body ovoid, depth 1½; silvery, young with 7 or 8 brown vertical streaks. **falciformis**

a^2. Body deeply ovoid, depth 1⅕ to 1⅓; silvery, at all ages black ocular band and second from dorsal spines to opercle---------------------**argenteus**

MONODACTYLUS FALCIFORMIS Lacépède

Monodactylus falciformis LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1801, p. 132; vol. 2, 1800, pl. 5, fig.4. No locality. (On COMMERSON.)—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 639 (Algoa Bay, Natal, Zululand, Delagoa Bay).

Psettus falciformis GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 488 (Red Sea).—DAY, Fishes of India, pt. 2, 1876, p. 234, pl. 51*A*, fig. 6 (Madras); Fauna Brit. India, vol. 2, 1889, p. 180.—SAUVAGE, Hist. Madagascar, Poiss., 1891, p. 334 (types of *Psettus orbicularis*).—WEBER, Zool. Jahrb. Syst., vol. 10, 1897, p. 142 (Illovo River. Natal).—BOULENGER Cat. Fresh Water Fish Africa, vol. 3, 1915, p. 120 (Red Sea, Mombasa, Durban, Illovo River, Algoa Bay, River Chalumna).

Psettus commersonii CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 250. Vanicolo.

Stromatoidea layardi CASTELNAU, Mem. Poiss. Afriq. Australe, 1861, p. 44. Algoa Bay.

Psettus orbicularis GUICHENOT, Mém. Soc. Sci. Cherbourg, vol. 12, 1866, p. 136. Madagascar.

Psettus argenteus (part) KLUNZINGER, Fisch. Roth. Meer., 1884, p. 117.

Psettus falcipinnis BOULENGER, Cat. Fresh Water Fish. Africa, vol. 3, 1915, p. 121, fig. 89 (evidently slip for *falciformis*).

Distinguished from *Monodactylus argenteus* chiefly by its less deep body contour. Reaches 160 mm.

Red Sea, South Africa, India, Vanicolo.

MONODACTYLUS ARGENTEUS (Linnaeus)

Chaetodon argenteus LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 272. In Indies; Amoen. Acad., vol. 4, 1759, p. 249; Syst. Nat. ed. 12, vol. 1, 1766, p. 4611 (Indian Seas).—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1242 (Indian Seas).—WALBAUM Arted. Pisc., vol. 3, 1792, p. 441 (on LINNAEUS).—FORSTER, Fauna Indica, 1795, p. 15.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 230 (Indian Seas).

Acanthopodus argenteus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 558, 559 (Sea of Indies).

Psettus argenteus RICHARDSON, Voy. Erebus and Terror, Ichth., 1844–48, p. 57, pl. 35, figs. 1–3 (Sydney).—RICHARDSON, Ichth. China Japan, 1846, p. 246 (Canton and Norfolk Island).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 487 (Moluccas, Amboina, Malay Peninsula, Ceylon, Australia).—KNER, Reise Novara, Fische, 1865, p. 164 (Madras).—DAY, Fishes of Malabar, 1865, p. 99.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 64 (Aden and Zanzibar).—KLUNZINGER, Verh. zool.-bot. Ges. Wien, vol. 20, 1870, p. 794 (Koseir).—Günther, Journ. Mus. Godeffroy, vol. 5, Heft 11, 1876, p. 140 (Samoa).—Day, Fishes of India, pt. 2, 1876, p. 235, pl. 51*B*, fig. 5.—Castelnau, Proc. Linn. Soc. New South Wales, vol. 3, 1877, p. 235 (Singapore, Malacca, Brisbane River mouth).—Günther, Philos. Trans. Roy. Soc. London, vol. 168, 1879, pp. 470, 471 (Rodriguez).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 379 (Endeavour River, Port Darwin, Port Denison); Fische, Rothes Meer., 1884, p. 117.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 25 (North Celebes and Macassar).—Boulenger, Proc. Zool. Soc. London, 1887, p. 661 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 180, fig. 62.—Kent, Great Barrier Reef, 1893, p. 290 (Moreton Bay, Queensland).—Ogilby, Edible Fishes of New South Wales, 1893, p. 91.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 514 (Luzon, Nasugbu, Batangas, Pasacao, Comarines, Curimao, Ilocos).—Weber, Zool. Jahrb. Syst., vol. 10, 1897, p. 142 (Cape of Good Hope, Kuysua Lagoon, Illovo River).—Düncker, Mitteil. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 157 (Singapore).—Pellegrin, Bull. Soc. Zool. France, vol. 30, 1905 p. 83 (Baie d'Along, Tonkin).—Steindachner, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 71, abth. 1, 1907, p. 144 (Tamarida, South Arabia).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 203 (Sarodrano, Madagascar).—Regan, Trans. Linn. Soc. London, vol. 12, pt. 3, 1908, p. 254 (Seychelles).—Zugmayer, Abh. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 13 (Mekran and Oman).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Mahambo and Fort Dauphin, Madagascar).—Boulenger, Cat. Fresh Water Fish. Africa, vol. 3, 1915, p. 121, fig. 90 (Zanzibar, Zambesi River mouth, Rodriguez).—McCulloch, Australian Zoologist, vol. 2, pt. 3, Feb 1922, p. 89, pl. 25, fig. 225*a* (New South Wales).

Monodactylus argenteus Bleeker, Verslag. Mededeel. Kon. Akad. Wet. Amsterdam, vol. 2, ser. 2, 1868, p. 291 (Rio, Bintang); Fauna Madagascar, Pollen, 1874, p. 65.—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 32 (Cavite).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 71 (Bulan).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Aparri, Iloilo, Calayan).—McCulloch, Rep. Fish. Endeavour, vol. 4, pt. 4, Oct. 31, 1916, p. 188 (off Bowen, Queensland, in 16 fathoms); Australian Zool., vol. 2, pt. 3, Feb. 10, 1922, p. 89, fig. 225*a* (New South Wales).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 21 (Cebu).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 38 (Madagascar); Bishop Mus. Bull., No. 22, 1925, p. 33 (Samoa); Proc. Acad. Nat. Sci. Phila., 1927, p. 286 (Vigan, Orion).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 640, pl. 26, fig. 3 (Knysna and Natal).

Scomber rhombeus Forskål, Descript. Animal., 1775, pp. xii, 58. Djedda, Red Sea.—Bonnaterre, Tabl. Ichth., 1788, p. 142 (Red Sea).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1338 (Red Sea).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 221 (on Forskål).—Schneider, Syst. Ichth. Bloch, 1801, p. 34 (Red Sea).

Centrogaster rhombeus Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1338 (Red Sea) (on Forskål).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 699 (on Forskål).

Centropodus rhombeus Lacépède, Hist. Nat. Poiss., vol. 3, 1802, pp. 303, 304 (Red Sea).

Psettus rhombeus Valenciennes, Hist. Nat. Poiss., vol. 7, 1831, p. 245 (Pondichery, Mauritius, Massauah, Red Sea); Règne Animal Cuvier, Ill., 1839, pl. 42, fig. 2.—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 58 (Singapore), p. 690 (Wahai), p. 718 (Tandjong Berikat at Koba, Banka), p. 741 (Boeloekomba); vol. 7, 1854, p. 361 (Batjan); vol. 8, 1855, p. 393 (Amboina); vol. 9, 1855, p. 259 (Siboga); vol. 10, 1856, p. 347 (Rio, Bintang); vol. 12, 1856, p. 214 (Nias); vol. 13, 1857, p. 284 (Tjirutjup, Biliton); vol. 15, 1858, p. 200 (Goram); vol. 18, 1859, p. 360 (Blinju, Banka); Verh. Batav. Genootsch. (Nal. Ichth. Bengal), vol. 25, 1853, p. 38.—Peters, Arch. Naturg., 1855, p. 247 (Mozambique).—Bleeker, Act. Soc. Ind. Néerland., vol. 1, No. 3, 1856, p. 7 (Macassar); vol. 2, No. 7, 1857, p. 5 (Amboina).

Monodactylus rhombeus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849 (1850), p. 1154 (Pinang, Malaysia, Singapore).—Bleeker, Nederland. Tijdschr. Dierk., vol. 1, 1863, p. 240 (Obi).

Depth 1⅕ to 1⅓; head 2⅗ to 3, width 1⅞ to 2. Snout 4 to 4½ in head from snout tip; eye 2⅖ to 2⅞, greater than snout, greater than interorbital in young to equal to interorbital with age; maxillary reaches beyond front eye edge, or to front pupil edge in adult, 2⅞ to 3⅕ in head; interorbital 2½ to 3, broadly convex. Gill rakers 6 + 22, lanceolate, 1¼ in gill filaments, which 1⅞ in eye.

Tubes 53 to 65 in lateral line to caudal base; 14 or 15 scales above lateral line to soft dorsal origin, 44 or 45 below. Scales with 2 basal radiating striae in young, disappearing with age; about 30 apical denticles in young, largely disappearing with age or becoming very minute and irregular; circuli basal, 42 to 50.

D. VIII, 29, i to 31, i, last spine 1½ to 3 in total head length, second branched ray 1 to 1⅗; A. III, 28, i to 30, i, third spine 1⅛ to 1⅞, second branched ray 2 to 3⅓ in combined head and body; least depth of caudal peduncle 2⅔ to 3 in head; caudal emarginate, 2⅓ to 2⅘; pectoral 1⅓ to 1⅔.

Back brown, below whitish, everywhere with brilliant silvery white reflections. Iris pale on silvery white. Fins all pale brownish, soft dorsal and anal lobes dusky brown terminally. In young deep brown band narrow from occiput joining its fellow, then down across middle of eye to cheek, where little wider. Second vertical brown line, usually diffuse from side of predorsal down along hind edge of opercle across pectoral base to anal origin. In very small examples tail contrasted white.

Red Sea, Zanzibar, Natal, Mauritius, Rodriguez, Madagascar, India, Ceylon, East Indies, China, Philippines, Queensland, New South Wales, Polynesia. Abundant in collections. According to Day it is silvery with purplish reflections and the back yellowish green, fading leaden. Caudal yellow with black narrow posterior edge and paired fins colorless. In preserved examples we find the dark vertical bands indistinct or absent.

14028. Baganga Bay, Mindanao. May 13, 1908. 5 examples. Length 63 to 175 mm.

11009 and 11010. Basut River, Luzon, tide-water. June 15, 1909. Length 100 to 117 mm.
16602. Beacon reef, Catbalogan, Samar. April 16, 1908. Length 103 mm.
One example. Bulan Island. July 22, 1909.
Fifteen examples. Canmahala Bay, in small stream, Ragay Gulf. March 11, 1909. Length 59 to 103 mm.
5525 to 5527. Catbalogan, Samar. April 16, 1908. Length 150 to 185 mm.
10952. Cebu market. August 25, 1909. Length 88 mm.
17027. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 65 mm.
4603 to 4609. Grande Island reef, Subig Bay. January 8, 1908. Length 165 to 188 mm.
6640. Iloilo market. March 28, 1908. Length 122 mm.
5194. Jolo market. March 7, 1908. Length 177 mm.
22555. Manila market. January 13, 1908. Length 70 mm. (caudal broken).
11604. Manila market. March 16, 1908. Length 135 mm.
21219 to 21221. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 30 ? to 46 mm. (small example, poor).
7901 and 7902. Mariveles Bay. February 1, 1909. Length 140 to 143 mm.
22001. Nakoda Bay, Palawan. December 31, 1908. Length 59 mm.
21986. Near mouth Tayabas River, Luzon. February 25, 1909. Length 60 mm.
20817. Paluan Bay, Mindoro. December 11, 1908. Length 140 mm.
21282. Panabutan Bay, Mindanao. February 6, 1906. Length 75 mm.
Seven examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 57 to 66 mm.
8481 to 8483. Port Dupon, Leyte. March 17, 1909. Length 95 to 140 mm.
19447. River at Pasacao, Luzon. March 9, 1909. Length 71 mm.
22293 and 22294. River at Port Dupon, Leyte. March 17, 1909. Length 65 to 78 mm.
8782, 8783, 21682, 21683. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 82 to 98 mm.
11371 and 11372. Sandakan market, Borneo. March 3, 1908. Length 125 to 133 mm.
A1175 to A1178. Gane Road, Gillolo Island. December 1, 1909. Length 190 to 205 mm.
12598 U.S.N.M. Seychelles. British Museum. Length 35 to 87 mm. Three examples.
52322 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 102 to 197 mm. Four examples.
56039 U.S.N.M. Bulan, Philippines. Bureau of Fisheries. Length 95 mm. [3594].
56286 U.S.N.M. Cavite. G. A. Lung. Length 40 mm. Two examples.
59943 U.S.N.M. Clarence River, New South Wales. Dr. D. G. Stead. Length 118 to 128 mm. Three examples.
72172 U.S.N.M. Iloilo, Philippines. R. C. McGregor. Length 75 mm.
72264 U.S.N.M. Calayan, Philippines. R. C. McGregor. Length 47 to 58 mm. Two examples.
84206 U.S.N.M. Cebu, Philippines. Dr. F. Baker. Length 147 mm.

Genus SCHUETTEA Steindachner

Schuettea STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 53, 1866, p. 449. Type *Schuettea scalaripinnis* STEINDACHNER, monotypic.
Bramichthys WAITE, Rec. Australian Mus., vol. 6, pt. 2, 1905, p. 72. Type *Bramichthys woodwardi* WAITE, monotypic.

Differs from *Monodactylus* in its fewer dorsal spines (5) and cycloid scales. Australia.

SCHUETTEA SCALARIPINNIS Steindachner

Schuettea scalaripinnis STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 53, 1866, p. 449, pl. 6, fig. 1. Port Jackson, Australia.—GÜNTHER, Zool. Record, 1866, Pisces, p. 141 (note).—MCCULLOCH, Zool. Res. Endeavour, vol. 1, 1911, p. 81, pl. 15 (Sydney and Bordi); Rec. Australian Mus., vol. 11, No. 7, 1917, p. 181 (note); Australian Zoologist, vol. 2, pt. 3, Feb. 10, 1922, p. 89, pl. 26, fig. 226*a* (New South Wales).

Scorpis boo[p]s PETERS, Monatsber. Akad. Wiss. Berlin, 1866, p. 519. New South Wales.

Bramichthys woodwardi WAITE, Rec. Australian Mus., vol. 6, pt. 2, 1905, p. 72, pl. 14. Mandurah, Western Australia.—STEAD, Proc. Linn. Soc. New South Wales, vol. 31, 1906, p. 496.

According to McCulloch, reaches 204 mm.

Family PLATACIDAE

Body rhomboid, deep. Front profile of head steep. Mouth terminal, horizontal. Maxillary short, without supplemental bone. Premaxillaries slightly protractile. Jaws with bands of slender, brushlike, pointed, movable teeth. No teeth on palate. Nostrils double. Gill openings lateral, broadly separated from isthmus. Branchiostegals 6 or 7. Air bladder simple. Scales small, ctenoid, densely cover vertical fins. Lateral line present, concurrent with back. One dorsal, spines nearly concealed, generally 3 to 9, short, graduated, rays 28 to 40. Anal spines 3, rays 22 to 30. Caudal peduncle short. Pectoral rays all branched. Ventrals thoracic, well developed, inserted below pectoral base.

A single genus in the Indo-Pacific.

Genus PLATAX Cuvier

Platax CUVIER, Règne Animal, vol. 2, 1817, p. 334. Type *Chaetodon teira* BLOCH, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 105.

Body greatly compressed and elevated. Snout very short. Mouth small. Teeth setiform, with outer row little enlarged, notched at tips. Preopercle entire. Gill rakers very short. Pseudobranchiae present. Air vessel simple. Pyloric coeca few. Vertebrae 24, of which 14 caudal. Scales 60 to 80. Head scaly laterally. Soft dorsal and anal anteriorly high, with thickened scaly bases. Caudal fin truncate. Pectoral short. Ventral with spine and 5 rays, greatly elongated in young.

These fishes conspicuous by their large flat, orbicular bodies, were divided into numerous species by the older writers. This eventuated as they are greatly subject to variations, especially with age. From the study of our materials we have been unable to maintain but two species.

ANALYSIS OF THE SPECIES

a^1. Front profile obtusely angular, angle formed at tip of mandible; scales large, less than 70; soft dorsal and anal rather rounded........**pinnatus**

a^2. Front profile evenly convex; scales small, 75 or more; soft dorsal and anal with elevated points anteriorly..........................**orbicularis**

PLATAX PINNATUS (Linnaeus)

Chaetodon pinnatus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 272. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 461.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1241 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 425 (on Linnaeus).—Forster, Fauna Indica, 1795, p. 14.—Schneider, Syst. Ichth. Bloch, 1801, p. 230 (India).

Platax pinnatus Bleeker, Atlas Ichth., vol. 9, 1877, p. 75, pl. (18) 380, fig. 1, pl. 382 (20), fig. 2 (Singapore, Java, Madura, Celebes, Batjan).

Chaetodon teira Forskål, Descr. Animal., 1775, pp. xii, 60. Lohaja.—Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 65, pl. 199 (Arabian and East Indian Seas).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 125 (Arabia and East Indies).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 417 (on Forskål).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 222 (Arabia and Tranquebar).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 460, 494 (Arabia).—Shaw and Nodder, Nat. Miscellany, vol. 19, 1807, pl. 800 (Indian Seas).

Platax teira Cuvier, Règne Animal, vol. 2, 1817, p. 334.—Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 68 (Djedda).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 226 (Malabar).—Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1150 (Pinang, Malay Peninsula, Singapore).—Peters, Arch. Naturg., 1855, p. 247 (Mozambique).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 492 (Moluccas, Borneo, Ceram, China, Bribê's Point, Pinang).—Kner, Reise Novara, Fische, pt. 2, 1865, p. 166 (no locality).—Bleeker, Nederland. Tijdschr. Dierk., vol. 2, 1865, p. 31 (Manila Bay).—Day, Fishes of Malabar, 1865, p. 101.—Playfair, Fishes of Zanzibar, 1866, p. 65 (Aden and Zanzibar).—Klunzinger, Verh. zool.-bot. Ges. Wien, vol. 20, 1870, p. 791 (Koseir).—Day, Fishes of India, pt. 2, 1876, p. 235, pl. 51B, fig. 4.—Günther, Journ. Mus. Godeffroy, vol. 11, Heft 5, 1876, p. 141 (Pelew Islands).—Bleeker, Atlas Ichth., vol. 7, 1877, p. 73, pl. (17) 379, fig. 2 (Sumatra, Batu, Nias, Pinang, Singapore, Bintang, Banka, Cocos, Java, Madura, Bawean, Borneo, Celebes, Sumbawa, Timor, Ternate, Batjan, Ceram, Amboina, New Guinea).—Klunzinger, Fische Roth. Meer., 1884, p. 118.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 25 (Kordo, Mysore).—Boulenger, Proc. Zool. Soc. London, 1887, p. 661 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 182, fig. 63.—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 280.—Kent, Great Barrier Reef, 1893, p. 290 (Cairns, Queensland).—Elera, Cat. Faun. Filip., vol. 1, 1895, p. 515 (Luzon, Manila, Cebu).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 41.—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 356 (Hokoto, Formosa; Rikuzen).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 526 (Mijako, Tokyo, Kagoshima, Bonin Islands, Okinawa, Kezeu, Formosa).—Düncker, Mitt. Nat. Mus. Hamburg, vol. 21, 1903 (1904), p. 157 (Singapore).—Steindachner, Denkschr. Akad. Wiss. Wien, Math. -Naturw. Kl., vol. 71, Heft 1, 1907, p. 145 (Scheich Othman, South Arabia).—Gilchrist and Thompson, Ann. South Afric. Mus., vol. 6, pt. 2, 1908, p. 188 (Natal).—Bean and Weed, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 598 (Batavia).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 13 (Mekran and Oman).—Weber, Siboga Exp., vol. 57, Fische 1913, p. 313 (Amboina).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Mahambo, Madagascar).—McCulloch, Austral. Zool., vol. 2, pt. 3, Feb. 10, 1922, p. 90, pl. 27 (New South Wales).

Chetodon daakar Bonnaterre, Tabl. Ichth., 1788, p. 81, pls. 95 and 389. Red Sea.

Chaetodon arthriticus Bell, Philos. Trans. London, 1793, p. 8, pl. 6. Sumatra.

Platax arthriticus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 229 (Java).—Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1151 (Pinang, Singapore).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 491 (Amboina, Pinang).—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 277.

Platax leschenaldi Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 223. New Guinea, Pondichery.

Platax leschenaulti Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 282.

Platax batavianus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 225. Batavia.—Kner, Reise Novara, Fische, pt. 2, 1865, p. 165 (Singapore).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 76, pl. (19) 381, figs. 1–2 (Sumatra, Nias, Pinang, Singapore, Bintang, Banka, Biliton, Java, Duizend Islands, Celebes, Solor, Ternate, Amboina, Waigiu).

Platax bataviensis Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 278.

Platax punctulatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 228. Timor.

Platax vespertilio japonicus Schlegel, Faun. Japonica, Poiss., dec. 10–14, 1846, p. 183, pl. 43. Nagasaki.

Platax xanthopus Bleeker, Nat. Tijds. Nederland. Indië, vol. 1, 1850, p. 105. Batavia.

Platax gampret Bleeker, Nat. Tijds. Nederland. Indië, vol. 1, 1850, p. 105. Batavia, Sumanap.

Platax boersii Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 758. Macassar.

Chaetodon setosus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 76. "American Ocean."

Platax anagou Thiollière, Fauna Woodlark, 1857, p. 170. Woodlark Island.

Platax melanosoma Bleeker, Act. Soc. Sci. Ind. Néerland. (Amboina), vol. 8, 1860, p. 10. Amboina; Atlas Ichth., vol. 9, 1877, p. 75, pl. (18) 380, fig. 4 (type; young).

Platax marginatus (Van Hasselt) Bleeker, Atlas Ichth., vol. 9, 1877, p. 76 (name in synonymy).

Platax fuscus (Kuhl and Van Hasselt) Bleeker, Atlas Ichth., vol. 9, 1877, p. 76 (name in synonymy).

Platax orbicularis (not Forskål) Jordan and Seale, Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 335 (Samoa).—Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 36, No. 7, 1911, p. 306 (Bora Bora).

Platax vespertilio (not Bloch) Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 606 (Mozambique).

Depth 1⅒ to 1⅛; head 3, width 1⅞ to 2. Snout 1⅘ to 2; eye 3⅛ to 4⅕, 1⅖ to 2¼ in snout, 1⅒ to 1⅔ in interorbital; teeth in 8 to 10 irregular series in jaws, forming broad bands, only outer or outer 2 series tridentate and these with lateral cusps small, low and inconspicuous; all other teeth slender and simple conic points; maxillary not reaching eye, only opposite hind nostril, 3⅓ to 3⅗ in head; interorbital 2⅘ to 3, broadly convex. Gill rakers 9 + 10, short, tubercles.

Scales 67 to 69 in lateral line to caudal base; tubes 45 to 57 in lateral line to caudal base; 20 to 22 scales above arch of lateral line to soft dorsal origin, 47 to 50 scales below to anal origin. Scales with 1 to 6 basal radiating striae; no apical denticles; circuli moderately fine.

D. V, 36, i or 37, i, fifth spine $1\frac{3}{5}$ in head to $2\frac{3}{5}$ in combined head and body in young, second branched ray 1 to 3; A. III, 25, i to 27, i, third spine $2\frac{1}{5}$ to $2\frac{4}{5}$ in head, second ray $1\frac{1}{3}$ in combined head and body in young, $1\frac{1}{3}$ in head in adult; caudal truncate in young, hind edge little concave with age, $2\frac{7}{8}$ to $3\frac{1}{2}$ in combined head and body; least depth of caudal peduncle 2 to $2\frac{1}{8}$ in head; pectoral $1\frac{1}{3}$ to $1\frac{1}{2}$; ventral $1\frac{5}{6}$ to $2\frac{4}{5}$ in combined head and body.

Brownish generally, little paler below, and whole body with pale turquoise to heliotrope purple reflections. Broad brown band wide as eye, from occiput to breast. Second broad brown band, little broader than first, from spinous dorsal until close behind ventral base. Sometimes traces of obscure brown band on tail close before caudal peduncle. Bands all rather obsolete or indistinct with age. Fins all pale brownish, hind edges of soft vertical fins usually edged with dark brown, borders variably broad or narrow and with age less distinctly defined from paler general color of fins. Pectorals pale. Ventrals dusky to blackish. Iris brownish.

Red Sea, Zanzibar, India, East Indies, China, Japan, Philippines, Melanesia, Micronesia.

8959. Between Paron Point and Jesus Point, Luzon. June 21, 1909. Length 345 mm.
8094. Burias Island, Alimango Bay. March 5, 1909. Length 190 mm.
A583. Busbus Point, Siasi. September 20, 1909. Length 145 mm. Hind caudal edge, banded white.
14187 to 14189. Cebu market. August 24, 1909. Length 44 to 70 mm.
One example. Cebu market. August 27, 1909. Length 40 mm.
21653. Cebu market. August 28, 1908. Length 35 to 65 mm. Two examples.
9376. Cebu market. August 29, 1909. Length 338 mm.
17892 and 17893. Cebu market. September 5, 1909. Length 53 to 58 mm.
A1543. Doc Can Island. January 7, 1910. Length 365 mm.
8401. Giant River, Port Dupon, Leyte Island. March 16, 1909. Length 190 mm.
A482 and A483. Lampinigan Island. September 11, 1909. Length 190 to 260 mm. Broken orange stripe before dorsal to snout, in smaller example follows only on nape, with spot or two on snout and forehead.
One example [1666]. Maculabo Island. June 13, 1909. Length 35 mm.
9354. Murcielagos Bay, Mindanao. April 21, 1909. Length 185 mm.
7255 and 7256. Port Matalvi, Luzon. November 23, 1908. Length 315 to 368 mm. Three examples. [721.]
8476. Rasa Island. April 1, 1909. Length 205 mm.
8478. River at Port Dupon, Leyte Island. March 17, 1909. Length 75 mm.
19286. Rohanga Calledini. Length 47 mm.
5037. Sitanki wharf. February 27, 1908. Length 180 mm.
(D. 5561). Teomabal Island. September 19, 1909. Length 16 mm.
6003. Zamboanga market. May 27, 1908. Length 145 mm.

4342 (tin tag). Length 145 mm. (Station 5066.)

A1370. Basa Island, Gulf of Boni, Celebes. December 17, 1909. Length 273 mm. Dusky bar from front of dorsal through shoulder to pectoral base and another from nape down through eye. Fins more or less yellowish, dorsal and anal with blackish vertical edges. Caudal tip yellow, with broad submarginal, blackish bar. Pectoral bright yellow, except basally. Ventrals largely black.

A863. Limbe Strait, Celebes. November 10, 1909. Length 321 mm.

5064. Sandakan, Borneo. February 29, 1908. Length 170 mm.

32702 U.S.N.M. Indian Archipelago. Roy. Museum of Leiden. Length 243 mm.

43901 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 110 to 123 mm. Six examples.

52498 U.S.N.M. Samoa. Bureau of Fisheries. Length 138 mm. As *Platax orbicularis.*

65982 U.S.N.M. Bora Bora, Society Islands. Length 38 mm. As *Platax orbicularis.*

72586 U.S.N.M. Java. Bryant and Palmer. Length 193 to 208 mm. Two examples.

Possibly *Platax novemaculeatus* McCulloch[1] is an extreme variation of the present species. It is surely with the same physiognomy. The presence of 9 dorsal spines may not be specific, as *Platax batavianus* Bleeker was supposed to differ from *Platax pinnatus* in having 7 dorsal spines, or 2 more than in the latter. Barnard thinks *P. novemaculeatus* may be a *Chaetodipterus.*

PLATAX ORBICULARIS (Forskål)

Chaetodon orbicularis Forskål, Descript. Animal., 1775, pp. xii, 59. Djedda, Red Sea.—Gmelin Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1265 (Arabia).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 440 (on Forskål).—Schneider, Syst. Ichth. Bloch, 1801, p. 231 (Arabia).

Chetodon orbicularis Bonnaterre, Tabl. Ichth., 1788, p. 80 (Red Sea).

Acanthinion orbicularis Lacépède, Hist. Nat. Poiss., vol. 4, 1803, pp. 499, 500 (Arabia).

Platax orbicularis Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 67, pl. 18, fig. 3 (Red Sea).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 232 (Djedda).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 490 (Port Essington).—Klunzinger, Verh. zool. -bot. Ges. Wien, vol. 20, 1870, p. 793 (Koseir).—Day, Fishes of India, pt. 2, 1876, p. 218.—Günther, Journ. Mus. Godeffroy, vol. 11, Heft 5, 1876, p. 140 (Society and Samoa Islands).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 25 (Macassar, Celebes).—Kent, Great Barrier Reef, 1893, p. 290 (Bowen to Thursday Island, Queensland).—Fowler, Journ. Acad. Nat. Sci. Phila., ser. 2, vol. 12, 1904, p. 544 (Padang).—Jordan and Seale, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 32 (Iloilo).—Evermann and Seale, Bull. Bur. Fisher., vol. 26, 1906, p. 97 (Jolo).—Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 246 (Zamboanga).—Jordan and Richardson, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 268 (Ticao and Cagayancillo).—Seale, Phillipine Journ. Sci., vol. 5, No. 4, 1910, p. 283 (Sandakan, Borneo).—Weber, Siboga Exp., vol. 57, Fische 1913, p. 313 (Menado, West Ceram, Tual).—Fowler, Copeia, No. 58, June 18, 1918,

---

[1] Biol. Res. Fish. Endeavour, vol. 4, pt. 4, 1916, p. 188, pl. 55, fig. 1. Off Bowen, Queensland, in 19 to 35 fathoms.

p. 64 (Philippines).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 105, pl. 24 (Manila, Monja Island, Hamilo, Nasugbu, San Miguel Bay, Cabusao, Calapan, Concepcion, Culion, Estancia, Dumangas, Guimaras, Dulag, Tacloban, Inabunga, Puerta Princesa, Butuan, Agusan River, Balabac, Caldera Bay, Tubigan, Jolo, Sibutu, Sitanki; Sandakan).

Chaetodon vespertilio Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 67, pl. 199. East Indies.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1257, (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 426 (copied).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 228 (Tranquebar).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 459, 490 (Japan).

Chetodon vespertilio Bonnaterre, Tabl. Ichth., 1788, p. 81, pl. 95, fig. 388.

Platax vespertilio Cuvier, Règne Animal, vol. 2, 1817, p. 334.—Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 43 (Red Sea).—Bennett, Fishes of Ceylon, 1830, pl. 5 (Ceylon).—Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1148 (Malay Peninsula, Pinang, Singapore).—Peters, Arch. Naturg., 1855, p. 247 (Mozambique).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1861, p. 489 (Amboina, Singapore, Pinang, Philippines, China).—Playfair, Fishes of Zanzibar, 1866, p. 64 (Aden and Zanzibar).—Klunzinger, Verh. zool.-bot. Ges. Wien, vol. 20, 1870, p. 792 (Koseir).—Day, Fishes of India, pt. 2, 1876, p. 236, pl. 5*a*, fig. 5 (Andamans).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 440 (Mauritius).—Castelnau, Proc. Linn. Soc. New South Wales, vol. 2, 1877, p. 235 (Cardwell).—Bleeker, Atlas Ichth., vol. 9, 1877, p. 74, pl. (17) 379, fig. 1, pl. 380 (18), figs. 2–3 (Sumatra, Batu, Nias, Pinang, Singapore, Bintang, Banka, Cocos, Java, Madura, Bawean, Bali, Celebes, Sangi, Solor, Ternate, Batjan, Buru, Obi major, Ceram, Ambonia, Goram, Waigiu, New Guinea, Philippines).—Klunzinger, Fische Roth. Meer., 1884, p. 118.—Meyer, An. Soc. Española Hist. Nat. Madrid, vol. 14, 1885, p. 25 (Manado, Celebes, Cebu, Mysore).—Boulenger, Proc. Zool. Soc. London, 1887, p. 661 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 183.—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 272.—Elera, Cat. Fauna Filip., vol. 1, 1895, p. 515 (Cebu).—Steindachner, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 421 (Ternate).—Fowler, Proc. Acad. Nat. Sci. Philadelphia. 1903, p. 161 (Zanzibar); Journ. Acad. Nat. Sci. Philadelphia, vol. 12 (2), 1904, p. 544 (Padang).—Willey, Spolia Zeylon., vol. 2, 1904, p. 51, fig. (mimicking dead leaf).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys.-Kl., vol. 26, abth. 6, 1913, p. 13 (Oman).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar).

Chaetodon pentacanthus Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 454, 473, pl. 11, fig. 2. "Le grand Océan" (Indo-Pacific).

Platax pentacanthus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 235 (Mauritius).

Platax albipunctatus Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 69, pl. 18, fig. 4. Massuah (Young).

Platax gaimardi Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 216. New Guinea.

Platax raynaldi Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 219. West coast of Ceylon, Pondichery, Malacca.

Platax ehrenbergii Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 221. Lohaja, Massuah, Ceylon, Mauritius.—Richardson, Ichth. China Japan, 1846, p. 245 (China).

Platax blochii Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 222. Mauritius, Pondichery, New Guinea.

Platax guttulatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 227, pl. 186. Mauritius (Young).

Platax teira (not Forskål) Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 55 (Zamboanga).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 605, pl. 31, fig. 6 (Natal, Delagoa Bay, Mozambique).

Depth 1 to 1⅛, slightly greater than body in very young; head 3 to 3½, width 1⅖ to 1⅘. Snout 2⅖ to 2⅘; eye 2⅞ to 4½, 1⅛ to 1⅘ in snout, 1⅛ to 1⅞ in interorbital; teeth in broad bands in jaws, in about 8 irregular series, outer 3 or 4 series tridentate and others simple and conic; maxillary reaches opposite eye, 3⅕ to 3⅖ in head; interorbital broadly convex, 2⅙ to 2⅓. Gill rakers 2+7, short, strong, conic.

Scales 76 to 80 in lateral line to caudal base; tubes 50 to 75 in lateral line to caudal base; 24 or 25 scales above lateral line at top of arch to origin of soft dorsal, 44 to 46 below to anal origin. Scales with 3 or 4 basal radiating striae; apical denticles 22 to 30, with 5 or 6 transverse series of basal elements; circuli fine.

D. V, 32, I or 33, I, fifth spine 1⅕ to 2 in head, second ray nearly equals combined head and body in young, 3⅔ in same in adult; A. III, 25, I to 26, I, third spine 2 to 2¾ in head, second branched ray 1⅗ in combined head and body in young, 4¼ in same in adult; caudal slightly emarginate, hind edge double concave with age, 2⅖ to 3⅕; least depth of caudal peduncle 2 to 2⅒ in head; pectoral 1¼ to 1½; ventral 1⅕ to 3⅓ in combined head and body.

Brownish generally, little paler on ventral surface of head and belly. In young general color more whitish and with silvered reflections, especially on lower side. Also broad deeper brown band nearly as wide as eye, from occiput to breast, includes eye in its course. Second band usually much paler, from dorsal spines to include pectoral base and space immediately behind ventral base. Sometimes obscure third band includes soft dorsal posteriorly and most of anal. With age almost all vertical bands obsolete or indistinct. Vertical fins largely like body color. Pectorals little paler and ventrals dusky to neutral brown, mostly dark in contrast. Iris more or less brownish.

Red Sea, Zanzibar, Mozambique, Mauritius, Reunion, Madagascar, Seychelles, India, East Indies, China, Philippines, Queensland, Polynesia.

8163 and 8154. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 203 to 256 mm. Dusky silvery without dusky or blackish bars. Fins fading to olive yellow. Vertical edge of dorsal, caudal tip, entire anal edge, ventrals and pectoral bases dark, almost black.

8797. Butauanan Island. June 12, 1909. Length 170 mm.

5363. Cebu market. April 5, 1908. Length 115 mm.

11761. Iloilo market. January 2, 1908. Length 55 mm.

5303. Iloilo, Panay. March 28, 1908. Length 465 mm.

A493 and A494. Lampinigan Island. September 11, 1909. Length 233 to 258 mm.

4512 and 4513, 10520 and 10521. Manila market. December 12, 1907. Length 73 to 110 mm.

6150. Mansalay, Mindoro. June 4, 1908. Length 369 mm.

7898. Mariveles Bay. January 30, 1909. Length 435 mm.

9229. Opol, Mindanao. August 4, 1909. Length 197 mm.

5904. Polloc, Mindanao. May 22, 1908. Length 190 mm.

5038. Sitanki wharf. February 27, 1908. Length 154 mm.

6002. Zamboanga. May 27, 1908. Length 400 mm.

A609. Singaan Island. September 21, 1909. Length 250 mm.

A743. Sipadan Island. September 28, 1909. Length 421 mm. Olive, with overshade of yellow. No crossbars except slightly darker shade from angle of gill opening downward through pectoral base. Fins bright yellow terminally except entirely black ventrals. Dorsal with vertical edge blackish. Caudal dusky at tip. Anal with blackish front extending horizontally across fin somewhat broader than pupil, vertical edge beyond blackish.

A1371. Basa Island, Gulf of Boni, Celebes. December 17, 1909. Length 331 mm. Dusky bar from nape through eye. No shoulder bar. Caudal not tipped yellow, dusky edge narrow. Fins without bright yellow.

A950. Dodepo and Pasejogo Islands. November 16, 1909. Length 157 mm.

56011 U.S.N.M. Jolo, Philippines. Bureau of Fisheries. Length 165 mm. [4158.]

57930 U.S.N.M. Zamboanga, Philippines. Dr. E. A. Mearns. Length 48 mm.

72168 U.S.N.M. Cagayancillo, Philippines. R. C. McGregor. Length 34 mm.

84208 U.S.N.M. Philippines. Dr. F. Baker. Length 118 mm.

84262 U.S.N.M. Zamboanga. Dr. F. Baker. Length 128 mm. As *Platax teira.*

Family EPHIPPIDAE

Body deep, usually greatly elevated, compressed. Caudal peduncle short. Head deep, front profile steep. Mouth small, terminal, horizontal. Premaxillaries protractile. Maxillary partly slips under narrow preorbital. No supplemental maxillary. Jaws with bands of slender, pointed, movable, brush-like teeth. Palate toothless. Nostrils double. Preopercle very finely serrated or entire. Gill membranes broadly united to isthmus, openings lateral. Gill rakers very short. Pseudobranchiae present. Branchiostegals 6 or 7. Subocular shelf wide or feeble. Occipital crest elevated. No parietal crests. Vertebrae 24, of which 14 caudal, precaudals with parapophyses from fourth. Ribs, except last 2 pairs, sessile. Posttemporal bifurcate, not joined to skull. Air vessel large, usually bifurcate in front, with 2 slender horns behind. Pyloric appendages few. Scales moderate or small, ctenoid, densely covering soft parts of vertical fins. Large accessory ventral scale. Lateral line present, concurrent with profile of back. Dorsal spines 7 to 11, depressible in groove. Soft dorsal and anal high in front. Anal spines 3 or 4, short. Caudal truncate or double concave, with 17 principal rays. Pectorals short, all rays branched. Ventrals thoracic, with spine and 5 rays, sometimes rudimentary.

Shore fishes mostly of large size, living in warm seas and often valued as food. Genera about 5, of which only one confined to the Atlantic.

ANALYSIS OF THE GENERA

a^1. Ephippinae. Snout about as long as eye; scales large, about 40 or more; third to fifth dorsal spines prolonged filaments; pectoral shorter than head........Ephippus

a^2. Drepaninae. Snout longer than eye; scales small, about 50 or more in lateral line; dorsal spines moderate, not filamentous terminally; pectoral twice as long as head........Drepane

Genus EPHIPPUS Cuvier

Ephippus Cuvier, Règne Animal, vol. 2, 1817, p. 335. Type *Chaetodon orbis* Bloch, designated by Jordan and Evermann, Genera of Fishes, pt. 1, 1917, p. 105.

Ilarches Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fishes), vol. 18, pt. 2, 1849, p. 1142. Type *Chaetodon orbis* Bloch, virtually (as *Ilarches* Cantor proposed to replace *Ephippus* Cuvier).

Differs from *Drepane* chiefly in the third to fifth dorsal spines elongated, filiform terminally, especially third. It also differs in the short pectoral, which shorter than the head, while in *Drepane* the long pectoral is twice as long as the head and nearly reaches the caudal base.

EPHIPPUS ORBIS (Bloch)

Chaetodon orbis Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 81, pl. 202, fig. 2. East Indies.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1244 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 410 (on Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 232 (Tranquebar).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 458, 459 (East Indies).

Chetodon orbis Bonnaterre, Tabl. Ichth., 1788, p. 84, pl. 95, fig. 390 (East Indies).

Ephippus orbis Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 127 (Pondichery, Malabar, East Indies).—Guérin, Règne Animal Cuvier, vol. 1, 1829-44, pl. 22, fig. 2; vol. 3, Poiss., p. 18 (Tranquebar, Malabar, East Indies).—Richardson, Ichth. China Japan, 1846, p. 245 (China).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 62 (Sumatra and Ceylon).—Day, Fishes of Malabar, 1865, p. 35; Fishes of India, pt. 1, 1875, p. 115, pl. 29, fig. 4.—Martens, Preuss. Exped. Ost-Asien, 1876, p. 388 (Bangkok, Siam).—Bleeker, Atlas Ichth., vol. 9, 1877, p. 20, pl. (3) 365, fig. 5 (Sumatra, Pinang, Singapore, Banka, Java).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Singapore).—Day, Fauna British India, vol. 2, 1889, p. 20, fig. 7.—Pellegrin, Bull. Soc. Zool. France, vol. 30, 1905, p. 84 (Baie d'Along, Tonkin).—Seale, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 282 (Sandakan, Borneo).—Johnstone, Rep. Pearl Fisher. Ceylon, vol. 2, 1914, p. 220 (off Aripu).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 11, pl. 2, fig, 1 (Sandakan, Borneo).

Ilarches orbis Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1142 (Pinang, Malay Peninsula, Singapore).—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 356 (Formosa).—

Fowler, Journ. Acad. Nat. Sci. Phila., ser. 2, vol. 12, 1904, p. 544 (Padang, Sumatra).

Chaetodipterus orbis Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 604, pl. 26, fig. 5 (Natal).

Ephippus melanopus Bleeker, Nat. Geneesk. Arch. Nederland. Ind. (Topog. Batavia), vol. 2, 1845, p. 520. Batavia.

Depth 1¼; head 3⅙ to 3⅕, width 1¾. Snout 2½ to 2⅞ in head; eye 2⅗ to 2⅘, equals snout, slightly greater or equal to interorbital; maxillary not quite reaching opposite front of eye, 3¾ in head; interorbital 2⅘ to 2⅞, broadly convex. Gill rakers 2+8, short points, about ⅛ of gill filaments, which 1½ in eye.

Scales 37 or 38 in lateral line to caudal base; 7 scales above lateral line, 16 below. Cheek with 4 or 5 rows of scales to preopercle ridge. Scales with 5 to 11 basal, radiating striae; apically 6 or 7 parallel submarginal striae, but not spinulose though irregularly segmented; circuli fine.

D. VIII, 19, i, second spine 2 to 2⅕ in combined head and body, third ray 1¼ to 1⅓ in head; A. III, 15, i, third spine 3⅛, second ray 1⅖ to 1⅗; least depth of caudal peduncle 2⅛ to 2⅕; caudal 1 to 1⅕, hind edge slightly double concave; pectoral 1⅗ to 1¾; ventral 1.

Pale brown, sides and below with pale leaden silvery tinge. Fins all pale. Iris pale.

Natal, India, Andamans, Ceylon, East Indies, Formosa. According to Day it reaches 155 mm. He describes the back and head grayish-green, sides and abdomen silvery shot with pink. Fin membranes diaphanous finely dotted with black, especially terminally and rays bluish-white. He also notes the young have a dark gray orbital band, another over the nape, 2 over the body and fins edged gray. We have received but few specimens.

5127 and 17909. Sandakan market, Borneo. March 4, 1908. Length 120 to 125 mm.

Genus DREPANE Cuvier

Drepane Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 129. Type *Chaetodon punctatus* Linnaeus, designated by Jordan and Evermann, Genera of Fishes, pt. 1, 1917, p. 136.

Drepanichthys Bonaparte, Isis, 1838, p. 1207. Type *Chaetodon punctatus* Linnaeus, virtually (as *Drepanichthys* Bonaparte proposed to replace *Drepane* Cuvier).

Enixe Gistel, Naturg. Thierr., 1848, p. ix. Type *Chaetodon punctatus* Linnaeus, virtually (as *Enixe* Gistel proposed to replace *Drepane* Cuvier).

Harpochirus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1144. Type *Chaetodon punctatus* Linnaeus, monotypic.

Cryptosmilia Cope, Trans. Amer. Philos. Soc., ser. 2, vol. 13, 1866 (1869), p. 401. Type *Cryptosmilia luna* Cope, monotypic.

Body greatly elevated and compressed. Snout short. Palate edentulous. Preopercle spineless. Pseudobranchiae present. Branchiostegals 6. Pyloric appendages few. Scales moderate. Antrorse, concealed predorsal spine, other spines 8 or 9, like 3 of anal, depressible in basal groove. Pectoral long, falcate.

One species widely distributed in the Indo-Pacific and along the shores of West Africa in the Eastern Atlantic.

DREPANE PUNCTATA (Linnaeus)

Chaetodon punctatus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 273. Asia; Syst. Nat., ed. 12, vol. 1, 1766, p. 461.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1243.—Walbaum, Arted. Pisc., vol. 3 1792, p. 443 (on Linnaeus).—Schneider, Syst. Ichth. Bloch, 1801, p. 231 (copied).

Drepane punctata Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 132, pl. 179 (Malabar, Java, New Guinea, China, Australia, Canton, Endeavour Strait).—Richardson, Ichth. China Japan, 1846, p. 244 (China).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 62 (Ceylon and Java).—Day, Fishes of Malabar, 1865, p. 36.—Kner, Reise Novara, Fische, 1865, p. 107 (Ceylon and Java).—Peters, Monatsber. Akad. Wiss. Berlin, 1868, p. 257 (Singapore).—Schmeltz, Mus. Godeffroy Cat., vol. 4, 1869, p. 15 (East Indies, Fort Mackay, Rockhampton).—Günther, Journ. Mus. Godeffroy, vol. 2-3, Heft 5-6, 1874, p. 55 (copied).—Day, Fishes of India, pt. 1, 1875, p. 116, pl. 29, fig. 5.—Martens, Preuss. Exped. Ost-Asien, 1876, p. 388 (Singapore, and Batjan).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 363 (Port Philip, Endeavour River, Cleveland Bay, and Port Darwin, Queensland).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Sarangoon, Canton, Palaboen).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Manado, Celebes).—Boulenger, Proc. Zool. Soc. London, 1887, p. 657 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 21, fig. 8.—Kent, Great Barrier Reef, 1893, p. 284 (369), pl. 44, fig. 3 (Port Darwin, Queensland).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 490 (Luzon, Manila Bay, Mindoro).—Düncker, Mitteil. Nat. Mus. Hamburg, vol. 21, 1903 (1904), p. 152 (Kuala Klang, Kuala Lumpur).—Regan, Journ. Bombay Nat. Hist. Soc., vol. 16, pt. 2, 1905, p. 330 (Persian Gulf).—Jordan and Seale, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 33 (Cavite).—Steindachner, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 71, Abth. 1, 1907, p. 139 (Gischin, southern Arabia).—Jordan and Richardson, Bull. Bur. Fisher., vol. 27, 1907 (1908), p. 268 (Manila and Lubang).—Regan, Ann. Durban Mus., 1908, p. 246 (Durban Bay).—Gilchrist and Thompson, Ann. South Afric. Mus., vol. 6, pt. 2, 1908, p. 162 (Natal).—Seale, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 282 (Sandakan, North Borneo).—Weber, Siboga Exped., vol. 57, 1913, p. 314 (Macassar).—Zugmayer, Abhand. Bayer. Akad. Wiss. Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 11 (Mekran and Oman).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Fort Dauphin, Madagascar).—McCulloch, Biol. Res. Endeavour, vol. 4, pt. 1, Oct. 31, 1916, p. 190 (off Bowen, Queensland, in 16 fathoms).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines); Journ. Bombay Nat. Hist. Soc., vol. 30, No. 2, 1925, p. 321 (Tuticorin, India); Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 251 (Delagoa Bay and Natal); Journ. Bombay Nat. Hist. Soc., Nov. 1926, p. 11 (Bombay).—Lele, Journ. Proc. Asait. Soc. Bengal, new ser., vol. 20, 1924, No. 6 (Nov. 1925), p. 285, pl. 12, fig. 1 (structural details and figures).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sept. 1927, p. 3, pl. 1, fig. 1 (Manila Bay, Malabon, San Miguel Bay, Tacligan, Mangarin, Iloilo, Bantayan Island, Catbalogan, Samar, Misamis, Davao; Hoihow; Hongkong; Sandakan).—Fowler, Proc. Acad. Nat. Sci. Phila. 1927, p. 286 (Orani, Orion, Philippines).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 601, pl. 26, fig. 2 (Natal, Delagoa Bay, Chinde).

Drepane punctatus Alleyne and Macleay, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 277 (Cape York).

Harpochirus punctatus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1144 (Pinang, Malay Peninsula, Singapore).—Bleeker, Nederl. Tijds. Dierk., vol. 2, 1865, p. 173 (Siam); Atlas Ichth., vol. 9, 1877, p. 19, pl (3)365, fig. 4 (Sumatra, Nias, Pinang, Singapore, Bintang, Banka, Java, Madura, Bali, Borneo, Celebes, Halmaheira, Batjan, Buru, Amboina, Waigiu, New Guinea, Philippines).

Chaetodon longimanus Schneider, Syst. Ichth. Bloch, 1801, p. 229. Tranquebar.

Drepane longimana Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 133 (Pondichery, Mahé, Java).—Richardson, Ichth. China, Japan, 1846, p. 245 (Canton).—Peters, Arch. Naturg., 1855, p. 280 (Daman, Malabar).—Lele, Journ. Proc. Asiat. Soc. Bengal, new ser., vol. 20, 1924, No. 6 (Nov. 1925), p. 286, pl. 12, fig. 2 (structural details and figures).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 5, pl. 1, fig. 2 (Estancía and Barotac Nuevo, Panay).

Harpochirus longimanus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay. Fish.), vol. 18, pt. 2, 1849, p. 1145 (Pinang, Malay Peninsula, Singapore).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 544, pl. 23, upper fig. (Padang).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 54 (Takao).

Drepane punctata var. *longimana* Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Nossi Bé, Madagascar).

Chaetodon falcatus Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 452, 471. Asia.

Ephippus terla Cuvier, Règne Animal, vol. 2, ed. 2, 1829, p. 191 (on *Chaetodon terla* Russell, Fishes of Coromandel, vol. 1, 1803, p. 64, fig. 81, Vizagapatam and Madras).

Cryptosmilia luna Cope, Trans. Amer. Philos. Soc., ser. 2, vol. 13, 1866 (1869), p. 401. Cape Palmas, Liberia.

Drepane punctata var. *africana* Osorio, Journ. Sci. Acad. Lisboa, vol, 2, ser. 2, 1892, p. 207. Rolas Island, West Africa.

Drepane punctata var. *octofasciata* Pellegrin, Act. Soc. Linn. Bordeaux, vol. 60, 1905, p. 51, fig. Mauritania coast.

Depth 1⅙ to 1⅕; head 2⅔ to 3, width 1⅞ to 2⅛. Snout 2⅕ to 2⅞ in head; eye 2⅔ to 4, 1 to 1⅔ in snout, greater than interorbital in young to equal to interorbital with age; maxillary reaches opposite front pupil edge, 2⅖ to 3 in head; interorbital 3⅘ to 4, broadly convex. Gill rakers 5 + 10, lanceolate, ¼ of gill filaments, which 1⅘ in eye.

Tubes 46 to 50 in lateral line to caudal base; 14 or 15 scales above lateral line, 33 to 35 below. Scales with 5 or 6 basal radiating striae; circuli fine.

D. VIII or IX, 20, I to 22, I, fourth spine 1⅖ to 1⅗ in head, seventh ray 1¼ to 1⅓; A. III, 17, I to 19, I, second spine 2⅖ to 3¾, second ray 1¼ to 1⅓; least depth of caudal peduncle 2⅓ to 2⅗; caudal broadly angular behind, median rays longest 1 to 1⅓; pectoral 1⅖ to 1⅔ in combined head and body; ventral 2¼ to 3.

Silvery white, back with light leaden tinge. Sometimes with 6 deeper leaden variably diffuse vertical bands, with alternating narrower ones in interspaces. On body sometimes vertical series of rather sparse dusky brown small vertical bars or spots. Soft dorsal and anal more or less grayish marginally, sometimes as brownish streaks on soft dorsal membranes marginally. Iris silvery white.

Red Sea, India, Ceylon, East Indies, Philippines, China, Queensland, Polynesia. Also in the Atlantic at West Africa. According to Lele reaches 380 mm. The pale vertically banded form, without dark spots does not seem distinct specifically.

Two examples. Abuyog, Leyte. July 26, 1909. Length 35 to 37 mm.
Two examples. Buena Vista, Guimaras Island, mouth of river. January 14 1909. Length 51 to 55 mm.
12076. Cauti market. December 1, 1908. Length 130 mm.
19727. Davao, Mindanao. May 16, 1908. Length 30 to 42 mm. Five examples.
4941. Iloilo market. March 29, 1908. Length 62 mm.
Three examples. Manila Bay. December 6, 1909. Length 44 to 63 mm.
4514. Manila market. December 12, 1907. Length 148 mm.
7633. Mouth of Malampaya River. December 26, 1908. Length 155 mm.
24131. Port San Vincent. November 18, 1908. Length 35 mm.
8525. Verde del Sur Island. April 6, 1909. Two examples. Length 135 mm.,
4115, 4116, 4118, 4119, 4120. West side San Miguel Bay. June 14, 1909. Length 103 to 124 mm.
5068. Sandakan, Borneo. February 29, 1908. Length 180 mm.
17910. Sandakan. March 4, 1908. Length 106 mm.
One example. Sandakan Bay. March 2, 1908. Length 55 mm.
56327 U.S.N.M. Cavite, Philippines. G. A. Lung. Length 162 to 178 mm. Two examples.
72217 U.S.N.M. Lubang, Philippines. R. C. McGregor. Length 90 mm.
72584 and 72585 U.S.N.M. Java. Bryant and Palmer. Length 90 to 164 mm.

Family TOXOTIDAE

Body oblong ovate, head and trunk constricted below. Head strongly pointed. Mouth very protractile. Maxillary narrow. Teeth small, simple and acute in jaws, also on palate. Nostrils double on each side of snout. Gills 4, slit behind fourth. Gill membranes free from isthmus. Pseudobranchiae present. Branchiostegals 7. Lower pharyngeals separate. No subocular shelf. Entopterygoid present. Ribs sessile, behind parapophyses which begin from third vertebra. Vertebrae 24, of which 14 caudal. Scales ctenoid. Vertical fins densely scaled. Lateral line conspicuous. Dorsal and anal opposite, in posterior half of body. Dorsal spines 4 to 6, continuous with short rays. Anal spines 3.

Genus TOXOTES Cuvier

Toxotes CUVIER, Règne Animal, vol. 2, 1817, p. 338. Type *Sciaena jaculatrix* PALLAS, monotypic.

Trompe GISTEL, Naturg. Thierr., 1844, pp. xi, 109. Type *Sciaena jaculatrix* PALLAS (virtually, as *Trompe* GISTEL proposed to replace *Toxotes* CUVIER).

Amblytoxotes BLEEKER, Arch. Néerl. Sci. Nat., vol. 11, 1876, p. 311. Type *Toxotes squamosus* HUTTON, orthotypic.

Body rather deep and compressed. Head conic, flattened above. Eye large. Mouth large, terminal, protractile. Lower jaw protrudes. Maxillary very slender, without supplemental bone. Fine teeth pluriserial in jaws, on palate, pterygoids and tongue. Preopercle denticulate. Scales 20 to 40 in lateral series. Head scaled. Dorsal spines 4 to 6, rays 11 to 14. Anal spines 3, rays 12 to 18.

Called the archer fishes as they are said to shoot insects alighting near the water, with drops of water expelled from the mouth. A single genus, with 6 species in the fresh waters and along the coasts of India, the Andamans, Burma, Siam, Malaya, the East Indies, Philippines, north Australia, New Zealand, and Polynesia.

ANALYSIS OF THE SPECIES

a^1. TOXOTES. Scales large, 22 to 48 in lateral series; spinous vertical fins scaly basally, greater terminal portion naked; dorsal rays 11 to 14; anal 11 to 17.
  b^1. Dorsal spines 4; scales 28 to 30 in lateral series, 13 or 14 transversely, and 4 above lateral line to dorsal base ---------------------------- **jaculator**
  b^2. Dorsal spines 5.
    c^1. Scales 23 or 24 in lateral series, 14 or 15 transversely, 3 between lateral line and dorsal base -- **oligolepis**
    c^2. Scales 33 or 34 in lateral series, 16 to 18 transversely, 5 between lateral line and dorsal base ------------------------------------ **chatareus**
    c^3. Scales 40 to 42 in lateral series, 19 or 20 transversely, 6 between lateral line and dorsal base -- **microlepis**
    c^4. Scales 46 in lateral series, 22 transversely ------------------------ **lorentzi**
a^2. AMBLYTOXOTES. Scales small, 85 in lateral series; spinous vertical fins equally scaly as soft fins; dorsal rays 23, anal 23 -------------- **squamosus**

TOXOTES JACULATOR (Pallas)

Sciaena jaculatrix PALLAS, Philos. Trans., vol. 56, 1766, p. 187, pl. 8, fig. 6. Batavia, Java.—BONNATERRE, Tabl. Encyclop., Ichth., 1788, p. 121 (Sea of Indies).

Labrus jaculator LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pp. 425, 464 (on BONNATERRE).—SHAW, Gen. Zool., vol. 4, 1804, p. 485, pl. 68.

Toxotes jaculator CUVIER, Règne Animal, vol. 2, 1817, p. 338; Hist. Nat. Poiss., vol. 7, 1831, p. 314, fig. 192 (Ganges River, Dorey Havre).—GUERIN, Iconog. Règne Animal, Poiss., vol. 1, 1829–44, pl. 26, fig. 3; vol. 3, Poiss., p. 19 (India and China).—DAY, Fishes of Malabar, 1865, p. 37 (copied).—PETERS, Monatsber. Akad. Wiss. Berlin, 1868, p. 257 (Calbigan, Basey River, Samar).—GÜNTHER, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—CASTELNAU, Proc. Zool. Acclim. Soc. Victoria, vol. 2, 1873, p. 84 (Port Darwin, North Australia).—DAY, Fishes of India, pt. 1, 1875, p. 117 (Andamans).—BLEEKER, Atlas Ichth. Ind.

Néerland, vol. 9, 1877, p. 4, pl. (1) 363, fig. 4 (Sumatra, Batu, Nias, Singapore, Bintang, Rio, Java, Borneo, Celebes, Sangir, Sumbawa, Timor, Ternate, Batjan, Buru, Ceram, Amboina, New Guinea, Philippines).—Vaillant, Nouv. Arch. Mus. Paris, vol. 5, 1873, p. 57 (Palawan).—Macleay, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 399 (Endeavour River, Queensland).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Singapore, Matang).—Sauvage, Bull. Soc. Philomath. Paris, ser. 7, vol. 7, 1882, p. 150 (Mé Nam, Siam).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (North Celebes, Mysore, New Guinea).—Day, Fauna Brit. India, vol. 2, 1889, p. 23.—Kent, Great Barrier Reef, 1893, p. 284, pl. 45, fig. 4 (Endeavour Estuary, Norman River, Queensland).—Weber, Zool. Ergebn. Reise Nederl. Ost Indien, vol. 3, 1894, p. 409 (Maros, Celebes).—Perugia, Ann. Mus. Civ. Genova, ser. 2, vol. 16, 1896, p. 50 (Si Natobe, Montawel Island).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 111 (Waigiu).—Fowler. Proc. Acad. Nat. Sci. Phila., 1927, p. 286 (Orani).

Toxotes jaculatar Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 490 (Batangas, Luzon, Nasugbu, Cavite, Santa Cruz, Cebu).

Toxotes jaculatrix Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 245 (Zamboanga).—Jordan and Richardson, Bull. Bur. Fisher., vol. 27, 1908, p. 268 (Mindoro).—Seale, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 282 (Sandakan, North Borneo).

Scarus schlosseri Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, p. 1282. Java (on Pallas).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 691 (on Gmelin).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 5, 18 (Java).

Depth 2⅕ to 2⅖; head 2⅖ to 2⅔, width 2 to 2⅛. Snout 3⅕ to 3⅗ in head from snout tip; eye 3⅓ to 4⅓ in snout, 1 to 2 in interorbital; maxillary reaches opposite ½ to ⅗ of eye, 1⅞ to 2⅛ in head; interorbital 2⅖ to 3, nearly flat or but slightly elevated. Gill rakers 2+5, only 3 on cerato-branchial developed, short, clavate, 1½ in gill filaments, which 2½ in eye.

Scales 28 to 30 in lateral line to caudal base and 4 or 5 nontubular on latter; 4 scales above lateral line, 8 or 9 below. Scales with 6 or 7 basal radiating striae and 1 to 12 incomplete auxiliaries with age; apical denticles 92 to 165, very fine, with 6 to 20 or more imperfect transverse series of basal elements; circuli fine.

D. IV, 12, third spine 2 to 2⅓ in total head length, second ray 2 to 2⅔; A. III, 15 or 16, third spine 2⅔ to 2⅘, first ray 2⅕ to 2½; least depth of caudal peduncle 3 to 3⅖; caudal slightly emarginate, 1⅖ to 1⅗; pectoral 1¼ to 1⅓; ventral 2 to 2⅖.

Back pale brown, lower surface whitish, with silvery reflections. Five large blackish brown blotches above, first on head, others on back. Iris pale. Fins all largely pale brownish with fourth blotch of upper surface extended over basal half at least of soft dorsal; also rather broad blackish blotch on soft dorsal edge posteriorly. Anal largely dusky to blackish brown, especially marginally, fin paler basally. Caudal light brown, much paler or whitish in young, basally with dusky. Paired fins pale.

Andamans, East Indies, Queensland.

7685. Baheli River. December 28, 1908. Length 237 mm.

Four examples. Basut River, Luzon. June 15, 1909. Length 35 to 41 mm.

21840 and 21841. Buena Vista, Guimaras Island. January 14, 1909. Length 135 to 140 mm.

5643. Busin Harbor, Burias Island. April 22, 1908. Length 188 mm.

21931. Caiholo River, Ulugan Bay, Palawan Island. December 29, 1908. Length 200 mm.

6062 to 6064, 11520, 23733 and 23734. Dumaca River, Luzon. February 25, 1909. Length 50 to 195 mm. Seven examples.

6560 to 6564. Head of Baheli River, Ulugan Bay, Palawan. December 28, 1908. Length 170 to 202 mm.

21947. Iwahig River and tributaries, Puerta Princesa, Palawan. April 4, 1909. Length 92 to 100 mm. Five examples.

19739 to 19747. Malampaya River, Palawan. December 26, 1908. Length 34 to 186 mm. Ten examples.

Two examples. Nakoda Bay, Palawan. December 31, 1908. Length 46 to 201 mm.

Six examples. Nato River tidal, Luzon. June 18, 1909. Length 25 to 47 mm.

11939. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 83 mm.

22618. Paluan River, Mindoro. December 11, 1908. Length 68 mm.

Eleven examples. Pangauran River, Port Caltom. December 16, 1908. Length 31 to 62 mm.

Two examples. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 30 to 35 mm.

13964. Port San Vincente, Palaui River. November 14, 1908. Length 43 to 150 mm. Five examples.

4991, 4995 to 4998, 5000, 5382 to 5383, 8265, 11246 and 11247, 21703 to 21706. Ragay River fresh water, Ragay Gulf. March 10, 1909. Length 65 to 262 mm.

8539. San Fernando, Union Province, Luzon. March 17, 1908. Length 82 mm.

6085 and 6086. Zamboanga market. May 29 1908. Length 214 to 245 mm.

11740. Sandakan market, Borneo. March 2, 1908. Length 158 mm.

5105. Sandakan Bay. March 3, 1908. Length 202 mm.

57983 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 175 to 180 mm. Two examples.

TOXOTES OLIGOLEPIS Bleeker

Toxotes oligolepis Bleeker, Verslag. Mededeel. Akad. Wet. Amsterdam, ser. 2, vol. 9, 1876, p. 162. Moluccas (Batjan? Buru?); Atlas Ichth., vol. 9, 1877, p. 3, pl. (1)363, fig. 3 (Batjan? Buru?).

Toxotes jaculator (not Pallas) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 314 (Buru).—Valenciennes, Règne Animal Cuvier, Poiss. Ill., 1839 pl. 44, fig. 3 (Buru).

Depth 2⅓, head 2⅖. Eye 3⅓ in head. Scales 23 or 24 in lateral line, 4 above, 9 or 10 below, 22 predorsal. D. V, 11 or 12; A. III, 16 or 17. Five broad, transverse, dusky bands on back. Length 141 mm. (Bleeker.)

Moluccas.

TOXOTES CHATAREUS (Buchanan-Hamilton)

Coius chatareus Buchanan-Hamilton, Fishes of Ganges, 1822, pp. 101, 370, pl. 14, fig. 34. Ganges mouths.

Toxotes chatareus Day, Fishes of India, pt. 1, 1875, p. 117, pl. 29, fig. 6 (Irrawaddi).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 2, pl. (1)363, fig. 5 (Pinang, Singapore, Borneo).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 364 (Queensland and Cleveland Bay).—Day, Fauna Brit. India, vol. 2, 1889, p. 23.

Toxotes jaculator (not Pallas) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 314 (Malacca).—Günther, Cat. Fish. Brit. Mus., vol. 2. 1860, p. 67 (part).—Day, Fishes of Malabar, 1865, p. 37.

Toxotes jaculator var. *malaccensis* Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay. Fish.), vol. 18, pt. 2, 1849, p. 1159. Pinang, Malayan Peninsula, Singapore.

Depth $2\frac{1}{10}$; head $2\frac{3}{5}$. Eye 4 in head. Scales 33 or 34 in lateral line, 4 above, 11 or 12 below, 22 predorsal. D. V, 12 to 14; A. III, 17 or 18. Irregular longitudinal row of 6 to 8 dusky to blackish blotches on back. Length 152 mm. (Bleeker.)

India, Burma, Malay Peninsula, East Indies, Queensland.

TOXOTES MICROLEPIS Günther

Toxotes microlepis Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 68. Siam.—Day, Fishes of India, pt. 1, 1875, p. 117, pl. 30, fig. 1 (Irrawaddi).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 2, pl. (1)336, fig. 1 (Sumatra and Borneo).—Day, Fauna Brit. India, vol. 2, 1889, p. 22, fig. 9.

Depth 2; head $2\frac{3}{4}$. Eye $3\frac{1}{5}$ in head. Scales 40 to 42 in lateral line, 9 above, 15 below. D. V, 13 or 14; A. III, 17 or 18. Back with 3 or 4 large dusky blotches, also dark band across caudal peduncle posteriorly and another at caudal base. Soft dorsal with 2 dark blotches. Anal broadly bordered darker. Length 130 mm. (Bleeker.)

Burma, Siam, East Indies.

TOXOTES CARPENTARIENSIS Castelnau[2]

Though very imperfectly noticed, may apply to *T. microlepis*. The following sets forth the few items given by Castelnau:

Snout less than $\frac{2}{3}$ of interorbital, little more than orbit. Dorsal more advanced than in *Toxotes microlepis*, spines longer or $3\frac{3}{4}$ in depth, all slender, 6 in number and third and fourth longest; dorsal rays 12. A. III, 16. Caudal forked. Four broad transverse dark bands.

TOXOTES LORENTZI Weber

Toxotes lorentzi Weber, Notes Leyden Mus., vol. 32, No. 4, 1910, p. 232. Merauke, Dutch South New Guinea.

Depth $2\frac{1}{4}$; head 3. Eye $3\frac{3}{4}$ to 4 in head. Scales 46 in lateral line, 7 above, 13 below. D. V, 13 or 14; A. III, 15 or 16. Back dark gray brown, pale to yellowish below. Vertical fins dark. Paired fins transparent, with dark dots. Length 115 mm. (Weber.)

---

[2] Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. 47. Norman River, Queensland.

TOXOTES SQUAMOSUS Hutton

Toxotes squamosus Hutton, Ann. Mag. Nat. Hist., London, ser. 4, vol. 16, 1875, p. 313. Cook Straits, New Zealand.

Depth 2⅓; head nearly 4. Snout equals interorbital. Eye 3½ in head. Mouth reaches opposite eye center. Teeth in jaws cardiform, outer row in premaxillary larger; each palatine with single row, none on vomer. Opercle, preopercle and maxillary scaly, margins smooth. Scales 85 in lateral line, 11 above, 18 below. Dorsals and anals covered with scales. Ventral with pointed axillary scale. D. V, 23; A. III, 23, first ray longest with fin suddenly contracting behind then uniformly short. Caudal deeply forked, lobes equal pectoral. Pectoral long and pointed. Ventral small. Uniform silvery, darker above. Length 560 mm. (Hutton.)

This species does not appear to have been noticed since described and has been omitted from New Zealand lists. Bleeker framed a distinct genus for it, especially on account of its increased soft dorsal and anal rays and small scales.

Hutton says of it: "This description is from a stuffed specimen belonging to W. T. L. Travers Esq., F. L. S. of Wellington, who kindly sent it to me for description. He informs me that several years ago he saw other specimens of this fish on the shores of Massacre Bay."

Family SCATOPHAGIDAE

Body subrhomboid, deep. Caudal peduncle short. Eye moderate. Jaws robust, not protractile. Teeth only in jaws, setiform, tricuspid. Preopercle without spine. Gill rakers few, short. Pseudobranchiae present. Branchiostegals 6. Post temporal firmly joined with skull. Vertebrae 24, of which 12 or 13 caudal. Scales uniformly small, ctenoid. Lateral line complete, concurrent with back. Dorsals well marked. Soft dorsal and anal higher than spinous fins. Caudal with 14 divided rays, truncate. Pectoral short.

One genus in the Indo-Australasian region. Allied with the Chaetodontidae in the solidly joined post temporal, these fishes differ in the complete lateral line, unarmed head and contrasted dorsal fins.

Genus SCATOPHAGUS Cuvier

Scatophagus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 136. Type *Chaetodon argus* Linnaeus, designated by Jordan and Evermann, Genera of Fishes, pt. 1, 1917, p. 136 (Versus *Scatophaga* Meigen 1802 in Diptera).

Prenes Gistel, Naturg. Thierr., 1848, p. x. Type *Chaetodon argus* Linnaeus, virtually (as *Prenes* Gistel proposed to replace *Scatophagus* Cuvier).

Cacodoxus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fishes), vol. 18, pt. 2, 1849, p. 1145. Type *Chaetodon argus* Linnaeus, virtually (as *Cacodoxus* Cantor proposed to replace *Scatoghagus* Cuvier).

Body greatly compressed, elevated, nearly cuboid. Snout moderate, broad. Mouth terminal, small, transverse. Palate toothless.

Preopercle entire. Air bladder simple. Pyloric appendages about 20. Scales very small. Soft dorsal scaly. Dorsal fins 2, joined at bases, spines 10 to 12 and recumbent one in front directed forward, rays 16 to 19. Anal spines 4, rays 14 to 16.

Indian Ocean and East Indies.

Two species established and though greatly similiar in a general way, their strongly marked color design has led us to consider them as two subgeneric groups. The great variation in these forms has led to many nominal species.

ANALYSIS OF THE SPECIES

a^1. SCATOPHAGUS. Body without vertical bands, always with dark spots, which are very variable, large and moderate in number to small and very numerous -- argus

a^2. DESMOPRENES, new subgenus.[3] Type *Chaetodon tetracanthus* LACÉPÈDE. Back and sides above with dark vertical bands or stripes, below with dark spots -- tetracanthus

SCATOPHAGUS ARGUS (Linnaeus)

Chaetodon argus LINNAEUS, Syst. Nat., ed. 12, vol. 1, 1766, p. 464. India.—BLOCH, Naturg. Ausl. Fische, vol.3, 1787, p. 86, pl. 204, fig. 1 (East Indies).—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1248 (India).—BLOCH, Naturg. Ausl. Fische, vol. 9, 1795, p. 100 (Tranquebar).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 409 (copied).—FORSTER, Fauna Indica, 1795, p. 15.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 232 (East Indies).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 455, 479 (Asia).

Chetodon argus BONNATERRE, Tabl. Ichth., 1788, p. 86, pl. 94, fig. 386 (no locality).

Scatophagus argus CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 136 (Ganges River, Malabar, Pondichery, Bengal).—RICHARDSON, Ichth. China Japan, 1846, p. 245 (Canton).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 58 (Singapore, Amboina, Ceram, Malacca, China, India).—DAY, Fishes of Malabar, 1865, p. 34.—KNER, Reise Novara, Fische, 1865, p. 106 (Singapore, Java, Tahiti).—PETERS, Monatsber. Akad. Wiss. Berlin, 1868, p. 257 (Pongoor, Singapore, Malacca, Quingoa River at Calumpit and Bicol River, Luzon).—SCHMELTZ, Mus. Godeffroy Cat., vol. 4, 1869, p. 15 (East Indies, Port Mackey, Rockhampton).—DAY, Fishes of India, pt. 1, 1875, p. 114, pl. 29, fig. 3. — MARTENS, Preuss. Exped. Ost-Asien, 1876, p. 388 (Bangkok, Pontiak, Panuranan).—CASTELNAU, Proc. Linn. Soc. New South Wales, vol. 2, 1877, p. 234 (Brisbane River mouth, Norman River entrance and Cardwell); vol. 3, 1878, p. 350 (Port Jackson).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 363 (Queensland and Port Darwin).—SAUVAGE, Bull. Soc. Philom. Paris, vol. 5, ser. 7, 1881, p. 105 (Swatow).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Sarangoon, Sadong Makang).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Manado, Celebes; Manila Bay and Cebu).—DAY, Fauna Brit. India, vol. 2, 1889, p. 18, fig. 6.—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 489 (Luzon, Manila Bay, Nasubu, Cebu, Visagas).—PELLEGRIN, Bull. Soc. Zool. France, vol. 30, 1905, p. 84 (Baie d'Along, Tonkin).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 246, fig. 8 (Zamboanga).—SEALE,

---

[3] Δεσμός band; *Prenes.*

Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 282 (Sandakan, Borneo).—Beaufort, Bijd. Dierk. Amsterdam, vol. 19, 1913, p. 124 (Amboina and West Ceram).—Weber, Siboga Exp., vol. 57, 1913, p. 302, pl. 10, figs. 1–5 (Lombok, Macassar, Saleyer).—Zugmayer, Abh. Bayer. Akad. Wiss., Math. Phys. Kl., vol. 26, abth. 6, 1913, p. 11 (Mekran).—Johnstone, Rep. Pearl Fisher. Ceylon, vol. 2, 1914, p. 220 (Ceylon).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).—McCulloch, Austral. Zool., vol. 2, pt. 3, February 10, 1922, p. 90 (New South Wales).—Hora, Mem. Asiat. Soc. Bengal, vol. 6, 1924, p. 490.—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 8, pl. 2, fig. 2, pl. 12, fig. 2 (Buguey, Vigan, Barrio Nalva, Alaminos, Iba, Malabon, Manila, Bicol River, Pasig River, Molawin Creek, Calapan, Bacon, Catarman, Bintoan, Bantayan Island, Iloilo, Estancia, Taytay, Inabanga, Cabalian, Agusan River, Malabang, Davao, Balabac, Tubigan).—Fowler, Proc. Acad. Nat. Sci. Phila., 1927, p. 286 (San Fernando, Orani, Orion).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, 1927, p. 618, pl. 26, fig. 4.

Cacodoxus argus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1145 (Pinang, Malay Peninsula, Singapore).—Bleeker, Nederl. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).

Ephippus argus Bleeker, Atlas Ichth., vol. 9, 1877, p. 21, pl. (1)361, fig. 2 (Sumatra, Batu, Nias, Pinang, Singapore, Bintang, Banka, Java, Medura, Bali, Borneo, Celebes, Timor, Batjan, Buru, Ceram, Amboina, Luzon).—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 356 (Suwata and Giran, Formosa).—Düncker, Mitt. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 151 (Singapore, Muar River at Bandar Maharani; Kuala Langat).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 544 (Padang).—Jordan and Seale, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 789 (Negros); Bull. Bur. Fish., vol. 26, 1906 (1907), p. 32 (Cavite).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 97 (Bacon and San Fabian).—Smith and Seale, Proc. Biol. Soc. Washington, vol. 19, 1906, p. 78 (Mindanao, Cavite, Bacon).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 268 (Manila and Iloilo).

Chaetodon piratalis Buchanan-Hamilton, Fishes of Ganges, 1822, pp. 122, 372, pl. 16, fig. 1. Ganges River.

Chaetodon atromaculatus Bennett, Fishes of Ceylon, 1828, pl. 18. Ceylon.

Scatophagus bougainvillii Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 142. No locality.—Richardson, Ichth. China Japan, 1846, p. 245 (China).

Scatophagus ornatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 143, pl. 180. Amboina (fresh water).—Richardson, Ichth. China Japan, 1846, p. 245 (China).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 59 (copied).—Kner, Reise Novara, Fische, pt. 2, 1865, p. 271 (Java).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Bangkok).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (North Celebes).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 490 (Luzon, Manila Bay, Cebu).

Scatophagus purpurascens Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 144, pl. 180. East Indies.

Scatophagus macronotus Bleeker, Nat. Geneesk. Arch. Nederland. Indië, vol. 2, 1845, p. 520. Batavia. (Monstrosity.)

Sargus maculatus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 65. Indian Ocean.

Scatophagus quadranus De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 455. Queensland coast.

Scatophagus brunneus KENT, Great Barrier Reef, 1893, p. 369. Queensland (Nomen nudum).

Scatophagus chameleon KENT, Great Barrier Reef, 1893, p. 369. Queensland (Nomen nudum).

Depth $1\frac{2}{5}$ to $1\frac{3}{4}$; head $2\frac{1}{3}$ to $3\frac{1}{5}$, width $1\frac{3}{4}$ to $1\frac{4}{5}$. Snout $2\frac{3}{4}$ to $3\frac{1}{8}$ in head; eye $3\frac{1}{8}$ to $4\frac{2}{3}$, greater than snout in young to $1\frac{2}{3}$ in snout with age; maxillary $\frac{1}{2}$ to $\frac{3}{4}$ in snout, 4 to $4\frac{2}{5}$ in head; interorbital $2\frac{1}{4}$ to $2\frac{2}{3}$, broadly convex. Gill rakers 5+13, lanceolate, short, $\frac{1}{4}$ of gill filaments, which equal eye.

Tubes 85 to 104 in lateral line to caudal base, about 60 in young; 22 to 30 scales above lateral line, 46 to 60 below. Scales with a single basal radiating stria; apical denticles 20 to 55, and 6 or 7 series transversely; circuli fine.

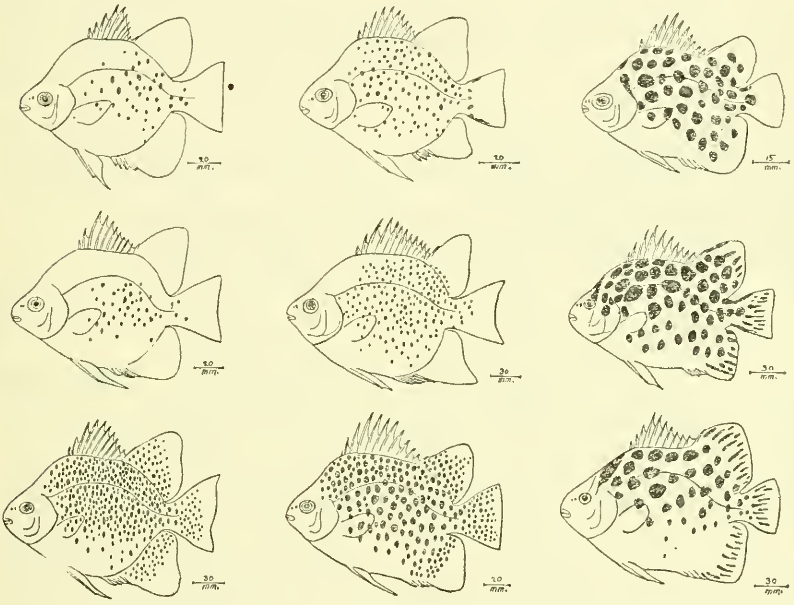
10 mm.
10 mm.
15 mm.
10 mm.
30 mm.
30 mm.
30 mm.
10 mm.
30 mm.

FIG. 1.—VARIATION OF COLOR MARKINGS OF SCATOPHAGUS ARGUS (LINNAEUS)

D. X or XI, 16, I to 18, I, fourth spine $1\frac{2}{5}$ to $1\frac{3}{5}$ in head, third ray $1\frac{1}{4}$ to $1\frac{1}{3}$; A. IV, 13, I to 15, I, second spine $2\frac{7}{8}$ to $3\frac{1}{5}$, third ray $1\frac{1}{10}$ to $1\frac{2}{5}$; least depth of caudal peduncle $1\frac{7}{8}$ to $2\frac{2}{5}$; caudal truncate to slightly double concave behind, $1\frac{1}{8}$ to $1\frac{2}{3}$; pectoral $1\frac{1}{2}$ to 2; ventral $1\frac{1}{2}$ in head in young to 3 in combined head and body in adult.

Back brown, with various gray to dark lavender tints. Under surface of head and body white with silvery tinge. Iris brownish. Vertical fins like back, or dark lavender brown to light brown, and usually more or less spotted or membranes with darker. Back, sides and often vertical fins very variably spotted, dotted or blotched with blackish brown to black. In some examples spots very large, even greater than eye or 7 or 8 along extent of lateral line. In others 15 or 20 small spots or dots would extend along lateral line. Sometimes spots very numerous, closely crowded, and in others very few, scattered and even absent from sections of the back and vertical fins. Paired fins pale brown.

India, Ceylon, Andamans, East Indies, Siam, Philippines, China, Queensland. Besides living along the shores of these countries it also enters tidal waters and rivers. The young are quite different from the adult, with a bony keel from the eye to the shoulder ending in a spine. When transformed, largely on account of their contrasted color pattern, they are sometimes exported as aquarium fishes. It is also said to be a foul feeder and not much used as a food fish. The variation in our series is very great in the size and number of dark spots on the body.

9059 and 9060. Abuyog, Leyte Island. July 26, 1909. Length 175 to 223 mm.

Twenty-six examples. Anilao River, Passi, Iloilo Province. January 13, 1909. Length 107 to 152 mm.

20131. Bacoor, Luzon market. June 15, 1908. Length 130 mm.

One example. Basut River, Luzon. June 15, 1909. Length 26 mm.

5360. Bumbum Island. September 25, 1909. Length 115 mm.

One example. Below Mindanao River mouth, Cotabato. May 20, 1908. Length 28 mm.

5847. Cotabato market. May 20, 1908. Length 150 mm.

21530. Cotabato, Rio Grande, Mindanao. October 26, 1903. Length 78 mm.

6714. Cavite market. December 1, 1908. Length 160 mm.

Seven examples. Cebu dock. September 5, 1909. Length 20 to 27 mm.

6059. Dumaca River, Luzon. February 25, 1909. Length 110 mm.

6642. Iloilo market. March 28, 1908. Length 91 mm.

21948 to 21950. Iwahig River, Palawan. April 4, 1909. Length 76 to 130 mm.

11395 and 11396. Joni River, Tayabas. February 25, 1909. Length 66 to 123 mm.

12317. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 100 mm.

19754 to 19756. Malampaya River, Palawan. December 26, 1908. Length 78 to 98 mm.

6773. Manila Bay. April 7, 1909. Length 255 mm.

Five examples. Nato River, Luzon. June 17, 1909. Length 17 to 27 mm.

9636. Nato River, Luzon. June 18, 1909. Length 15 to 156 mm. Six examples.

One example. Nato River, Luzon. June 19, 1909. Length 25 mm.

19629, 21995. Near mouth of Tayabas River, Luzon. February 25, 1909. Length 57 to 73 mm.

5350 and 5351. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 88 to 95 mm.

Two examples. Pangauran River, Port Caltom. December 16, 1908. Length 28 to 42 mm.

6733. Passi, Panay, Iloilo. January 14, 1909. Seven examples. Length 138 to 164 mm.

19637. Pancol, Palawan Island. December 25, 1908. Length 67 mm.

7324, 7326 to 7329. Pucot River, Mariveles. January 29, 1909. Length 70 to 94 mm.

20075 and 20076. Pucot River, Mindanao. January 30, 1909. Length 44 to 50 mm.

11248 to 11250, 22940 to 22943. Ragay River, Ragay Gulf. March 10, 1909. Length 110 to 144 mm.

Four examples. River at Nakoda Bay. December 31, 1908. Length 55 to 84 mm.

22487 to 22490. River at Port Dupon, Leyte. March 17, 1909. Length 48 to 58 mm.

8545. San Fernando, Union Province, Luzon. March 17, 1908. Length 72 mm.

A790. Sebatic Island. October 1, 1909. Length 190 mm.

5628, 5629, 5631, 19871 to 19873. Stream at Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 63 to 120 mm.

21823. Yervi River, Tayabas. February 25, 1909. Length 55 mm.

6090 and 6091. Zamboanga market. May 29, 1908. Length 190 to 210 mm.

(D. 5598.) Zamboanga. October 12, 1909. Length 10 to 11 mm. Five examples.

5073. Sandakan, Borneo. February 29, 1908. Length 198 mm.

5100, 5103, 12048. Sandakan. March 2, 1908. Length 107 to 180 mm.

6831 to 6832. Hong Kong market. October 18, 1909? Length 183 to 200 mm.

Twelve examples. Kowloon dock, China, August 19, 1909. Length 15 to 24 mm. Dark above, bars blackish. Forehead, nape, spinous dorsal membranes and blotch at both anterior and posterior base of soft dorsal scarlet, also front of ventrals. First dorsal and ventral blackish, other fins hyaline or whitish. These little fish were swimming slowly at the surface, feeding in garbage, and could dive quickly when frightened. Not very abundant and one larger one seen.

Five examples. Kowloon. August 22, 1908. Length 13 to 18 mm.

Ninety-one examples. Kowloon. September 9, 1908. Length 13 to 24 mm.

Two examples. Kowloon. September 12, 1908. Length 20 mm.

Twenty-nine examples. Kowloon. September 14, 1908. Length 15 to 24 mm.

Sixteen examples. Kowloon. September 18, 1908. Length 14 to 23 mm.

5709 U.S.N.M. Hong Kong. William Stimpson. Length 82 to 147 mm. Two examples.

30645 U.S.NM. New Guinea. Australian Museum. Length 167 mm. One example.

32726 U.S.N.M. Indian Archipelago. Leiden Museum. Length 128 mm.

44766 U.S.N.M. Rangoon. L. Fea. Length 55 mm.

45072 U.S.N.M. Philippines. H. Veitch. Length 94 to 106 mm. Three examples.

52036 U.S.N.M. Southern Negros. Dr. Bashford Dean, 1901. Length 95 mm.

55937 U.S.N.M. Bacon. Bureau of Fisheries. Length 165 mm. [4087].

55986 U.S.N.M. Rio Grande, Mindanao. Philippine Commission. Length 260 mm. [4222].

56303 U.S.N.M. Cavite. G. A. Lung. Length 130 mm.

57925 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 32 mm.

61158 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 90 to 102 mm. Two examples.

72201 U.S.N.M. Iloilo. R. C. McGregor. Length 60 mm.

82102 U.S.N.M. Soerabaia, Java. W. L. Brind. Length 34 to 51 mm. Five examples. All with large spots.

87016 U.S.N.M. Foochow, China. Sowerby. Length 78 to 170 mm. Two examples. Both with large dark spots.

DESMOPRENES, new subgenus

Type.—*Chaetodon tetracanthus* Lacépède.

Diagnosis.—Differs from the subgenus *Scatophagus* Cuvier in the color pattern, the back and sides above with dark vertical bands or stripes, below with dark spots. Indian Ocean. A single species.

SCATOPHAGUS TETRACANTHUS (Lacépède)

Chaetodon tetracanthus Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 726, 727. No locality.

Scatophagus tetracanthus Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 60 (copied).

Ephippus tetracanthus Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1925, p 250 (Delagoa Bay).

Chaetodon striatus Rosenthal, Ichthyol. Taf., Berlin, 1812–25, pl. 13, fig. 2.

Scatophagus fasciatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 144 (on Commerson).

Scatophagus multifasciatus Richardson, Voy. Erebus and Terror, Fish, 1844–48, p. 57, pl. 35, figs. 4–6. King George's Sound, Australia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 60 (type, Sydney, Cape York).—Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 56, Heft 1, 1867, p. 310 (Cape York).—Alleyne and Macleay, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 277 (Cape York and Hall Sound).—Castelnau, Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. (350) 376 (Port Jackson).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 363 (Port Darwin, Port Denison, Cleveland Bay).—Macleay, Proc. Linn. Soc. New South Wales, vol. 8, 1883, p. 370 (Lower Burdekin River, Queensland).—McCulloch, Austral. Zool., vol. 2, pt. 2, 1922, p. 90, pl. 26 (New South Wales).

Ephippus multifasciatus Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 44 (Victoria).

Scatophagus aetate-varians De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 456. Queensland coast.—Kent, Great Barrier Reef, 1893, p. 284 (369), pl. 47, fig. 4 (Queensland).

Scatophagus semistrigatus Kent, Great Barrier Reef, 1893, p. 370. Queensland. (Nomen nudum).

Scatophagus argus (part) Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 618 (Delagoa Bay).

Differs from *Scatophagus argus* in the presence of 6 to 17 dark vertical bands on the back. Though the type was but 188 mm. long, McCulloch says the species reaches 408 mm.

East Africa, New Guinea, Australia.

30622 U.S.N.M. New Guinea. Australian Museum. Length 93 to 97 mm. Two examples. Both with 7 dark vertical lines and few dark spots on lower sides.

Family CHAETODONTIDAE

Body strongly compressed, elevated, suborbicular in outline. Mouth small, protractile, terminal. Eyes moderate, lateral. Maxillary very short, variable, divided by longitudinal suture. Teeth brushlike or setiform, often extremely long, in narrow bands in jaws; palate toothless. Gill membranes more or less joined to isthmus. Gill rakers very small. Pseudobranchiae very large. Branchiostegals 6 or 7. Vertebrae 24, of which 14 caudal, anterior abbreviated. Scales moderate or small, finely ciliated or nearly smooth, cover body and head, dense over soft vertical fins. Lateral line present, arched like back but not reaching caudal fin. Dorsal single, continuous, rays sometimes filamentous. Anal like soft dorsal, with 3 or 4 spines. Caudal usually truncate. Pectoral small. Ventral thoracic, with spine and 5 rays.

Carnivorous tropical reef fishes. Almost all are handsomely and brilliantly colored, often with ornamental design. They are active and graceful swimmers. The young are quite unlike the adult and in the early or *Tholichthys* stage with membranes developed as broad collars or plates about the head and neck. The following are young in the *Tholichthys* stage which we have been unable to identify:

One example. Busin Harbor. April 22, 1908. Length 14 mm.

One example. Masamat Bay, Quinalasag Island. June 11, 1909. Length 10 mm.

One example. Nogas Point, Panay Island. February 3, 1908. Length 11 mm.

One example. Marinduque Island at Santa Cruz. April 23, 1905. Length 16 mm.

One example. Tumindao anchorage. February 25, 1908. Length 18 mm.

Two examples. Varadero Bay, Mindoro. July 23, 1908. Length 10 to 21 mm.

One example. D. 5588. Philippines. September 28, 1909. Length 20 mm.

One example. D. 5129. Philippines. Length 20 mm.

ANALYSIS OF THE GENERA

a^1. CHAETODONTINAE. Preopercle unarmed; scales rather large; young mostly with *Tholichthys* stage.
  b^1. Snout tubiform, elongated, produced.
    c^1. Dorsal spines 9 to 11.
      d^1. Dorsal spines 9 -- **Chelmo**
      d^2. Dorsal spines 11 ---------------------------------- **Chelmonops**
    c^2. Dorsal spines 12 or 13 ---------------------------------- **Forcipiger**
  b^2. Snout conic, moderate or short and not especially produced.
      e^1. Dorsal spines not greatly elongated or prolonged in flexible filaments.
        f^1. Teeth rudimentary or absent; dorsal spines 8 to 10 ---- **Coradion**
        f^2. Teeth well developed.
          g^1. Dorsal spines 6 or 7; front dorsal and anal rays prolonged. **Parachaetodon**
          g^2. Dorsal spines 10 to 16.
            h^1. Scales large, 30 to 50 ---------------------------- **Chaetodon**
            h^2. Scales small, more than 60.
              i^1. Scales 60 to 75.
                j^1. Teeth small; dorsal rays 24 to 26 ------ **Hemitaurichthys**
                j^2. Teeth long, large, strong; dorsal rays 17 -- **Microcanthus**
              i^2. Scales 88 to 90 ---------------------------------- **Vinculum**

c^2. Dorsal spines elongated and at least one prolonged in filament; front of head with bony protruberances; scales moderate---**Heniochus**

a^2. POMACANTHINAE. Preopercle angle armed with very strong spine; vertical limb of preopercle with 10 to 30 small teeth; interopercle with 1 to 4 strong spines; dorsal with 14 graduated spines, last longest--------**Holacanthus**

Genus CHELMO Oken

Chelmo OKEN, Isis, 1817, p. 1782. On CUVIER, Règne Animal, vol. 2, 1817, p. 334. Type *Chaetodon rostratus* LINNAEUS, designated by BLEEKER, Arch. Néerland. Sci. Nat., vol. 11, 1876, p. 303.

Chelmon CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 87. Type *Chaetodon rostratus* LINNAEUS, designated by BLEEKER, Arch. Néerland. Sci. Nat., vol. 11, 1876, p. 303.

Known by the greatly reduced dorsal spines, but 9 in number, in combination with its long snout.

CHELMO ROSTRATUS (Linnaeus)

Chaetodon rostratus LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 273. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 462.—BLOCH, Naturg. Ausl. Fische, vol. 3, 1787, p. 78, pl. 202, fig. 1 (East Indies).—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, p. 1244 (India).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 423 (on LINNAEUS).—FORSTER, Fauna Indica, 1795, p. 15.—BLUMENBACH, Handb. Naturg., 1799, p. 275.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 221 (East Indies).—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 457, 486 (Batavia).—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 87, (Java).

Chetodon rostratus BONNATERRE, Tabl. Ichth., 1788, p. 83, pl. 45, fig. 170 (East Indies).

Chelmon rostratus BENNETT, Life of Raffles, 1830, p. 689 (Sumatra).—CANTOR, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1140 (Singapore, Malacca).—BLEEKER, Nederl. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).—JOUAN, Mém. Soc. Nat. Cherbourg, vol. 2, ser. 2, 1866, p. 123 (Poulo-Condor, off Lower Cochin).—PETERS, Monatsber. Akad. Wiss. Berlin, 1868, p. 257 (coral reef at Paracili, Luzon).—DAY, Fishes of India, pt. 1, 1875, p. 110, pl. 20, fig. 3.—CASTELNAU, Res. Fish. Australia (Victoria Rec. Philadelphia Exhib.), 1875, p. 14 (Cape York, Queensland).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 22, pl. (7) 369, fig. 2 (Sumatra, Singapore, Bintang, Banka, Biliton, Lepar, Deuzend Islands, Java, Bawean, Celebes, Banda, Philippines).—DAY, Fauna Brit. India, vol. 2, 1889, p. 11, fig. 2.—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 488 (Manila, Luzon, Navotas).—JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 33 (Cavite).—BEAUFORT, Bijd. Dierk. Amsterdam, vol. 19, 1913, p. 125 (Sorong, New Guinea).—MCCULLOCH, Australian Zool., vol. 2, pt. 3, Feb. 10, 1922, p. 91, pl. 27, fig. 231*a* (Iluka, New South Wales).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 56 (Cebu).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 12 (type: Singapore; Indian Ocean; New Guinea; Paracali, Luzon).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 14, pl. 3, fig. 1 (Manila Bay, Bantayan Island, Cebu, Estancia, Dumangas, Inabanga, Tawi Tawi, Sitanki).

Chelmo rostratus VALENCIENNES, Règne Animal, Poiss., Ill., 1839, pl. 40, fig. 1–1*a* (no locality).—GRAY, Cat. Fish. Gronow, vol. 2, 1854, p. 73.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 36 (Celebes, Singapore, India, Port Essington).—Kner, Reise Novara, Fische, 1865, p. 103 (Madras).—Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 60, Heft 1, 1870, p. 561 (Singapore).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Singapore).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (North Celebes).—Gorgoza, An. Soc. Española, Hist. Nat. Madrid, vol. 15, 1865, p. 73 (Philippines).—Düncker, Mitt. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 147 (Singapore).

Chaetodon enceladus Shaw and Nodder, Nat. Miscellany, vol. 2, 1791, pl. 67. India.

Chelmon marginalis Richardson, Ann. Mag. Nat. Hist., London, vol. 10, 1842, p. 29. Port Essington, Australia.

Chelmo marginalis Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 36 (Swan River; type of *Chelmon marginalis* Richardson).—Macleay, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 352 (Port Darwin).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 361 (Port Darwin).

Chelmo mülleri Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 361. Australia.

Chelmon mülleri McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, Oct. 31, 1916, p. 193, pl. 55, fig. 2 (off Bowen, Queensland).

Chelmo pulcher Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 70, Heft 1, 1874–75, p. 382. Mauritius.

Depth 1½ to 1¾; head 2⅕ to 2¼, width 3 to 4. Snout 1⅘ to 2⅛ in head from snout tip; eye 3⅞ to 4½, 1⅞ to 3⅛ in snout, equals interorbital; maxillary ⅔ to ¾ to eye, 2½ to 2⅔ in head; interorbital 4½ to 6, slightly convex. Gill rakers 3 + 7 rather flexible short points, about ⅛ of gill filaments, which 1¼ in eye.

Scales 43 to 48 between gill opening and caudal base; tubes 43 to 46 in lateral line to caudal base; 10 scales above lateral line, 21 to 24 below. Scales with 12 to 17 basal radiating striae; apical denticles 48 to 76, with 4 to 7 series of basal elements transversely; circuli fine.

D. IX, 28, i or 29, i, last spine 1⅞ to 2¼ in total head length, eighth ray 1⅖ to 1⅘; A. III, 19, i or 20, i, last spine 2⅛ to 2⅓, fourth ray 1⅔ to 2; least depth of caudal peduncle 4 to 4½; caudal 2⅕ to 2⅗, hind edge broadly convex; pectoral 1⅗ to 1⅞; ventral 1⅕ to 1½.

Light brown, paler and with silvery reflections below. Five broad brownish vertical bands; first through eye down to gill opening but not on chest; second from first dorsal spine, before pectoral to ventral origin; third from last dorsal spines to vent; fourth broadest from base of soft dorsal to that of anal; last blackish, narrowest at base of caudal, across caudal peduncle; each of these bands with narrow inner darker border line and outer whiter one. Each row of body scales with median or marginal dark longitudinal line or stripe. At soft dorsal near base and medially black ocellus with white marginal ring. Soft dorsal and anal with narrow whitish and brown submarginal narrow band. Fins otherwise all pale brownish, ventrals inside with anterior or front half deeper brown and leaving broad whitish inner for hind border.

East Africa, Mauritius, India, Malacca, East Indies, China, North Australia. Bleeker states that it is reputed to ejaculate drops of water at insects near the edge of the water, as they may happen to alight on vegetation, but that he has been unable to confirm such claim during his long stay in the East Indies. As it is a reef dweller this is hardly likely.

Günther separates the nominal *Chelmon marginalis* Richardson, though he states it is "perhaps a variety of *Ch. rostratus*."

Quite likely *Chelmo pulcher* Steindachner founded on an imperfect example in the Museum of Comparative Zoölogy, from Mauritius, is also this species. *Chelmon mülleri* Klunzinger, as figured and described by McCulloch, does not appear to be different.

3638 and 3639. Alibijaban Island. March 6, 1909. Length 157 to 160 mm.

641. Butauanan Island. June 13, 1909. Length 150 mm.

1208. Capulaan bay, Pagbilao Island. February 24, 1909. Length 137 mm.

5539. Cataingan, Masbate. April 17, 1908. Length 130 mm.

840, 841, 1096. Catbalogan. April 15, 1908. Length 122 to 155 mm.

11792. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 155 mm.

1147. Cebu market. April 6, 1908. Length 113 mm. Ocular and 4 body bands of cadmium orange, with dusky margins, which also edged with pearl gray. Ocular band begins eye diameter before dorsal and ends just below interopercle. First body band begins on first to third dorsal spines, extends downward across opercle and belly to ventral base. Second body band begins on sixth and seventh spines and extends to vent. Third body band covers most of first to twelfth dorsal rays, narrowing somewhat as it extends down across front anal rays. Fourth body band connected at upper and lower ends with third, passes along vertical edges of soft dorsal and anal over caudal peduncle. Cross band of black on center of caudal peduncle, margined with pearl gray. Median band from nape to snout end same color as body bands. Interspaces between body bands silvery gray, pearl gray between rows of scales, especially posteriorly and below. Dorsal spines dusky, membranes along posterior edge cadmium orange. Black ocellus in center of soft dorsal, margined with pearl gray; rays separated at tips, dusky, with submarginal pearl gray stripe. Caudal base orange, rest of fin hyaline. Anal like dorsal, without ocellus. Pectoral hyaline, base dusky. Ventral spine cadmium orange, rays white with yellowish wash and second to fifth distinctly cadmium orange.

8159. Cebu market. August 29, 1909. Length 90 mm.

558 and 559. Daisy Island. January 6, 1910. Length 135 to 136 mm.

323 to 326. Endeavor Strait. December 23, 1908. Length 150 to 163 mm.

443. Galvaney Island, Luzon, March 9, 1909. Length 147 mm.

One example. Mactan Island, tide-pools. August 31, 1909. Length 20 mm.

5447. Maculabo Island. June 14, 1909. Length 144 mm.

1036 to 1040. Masamat Bay, Quinalasag Island. June 12, 1909. Length 133 to 146 mm.

9347. Murciclagos Bay, Mindanao. August 21, 1909. 2 examples. Length 136 to 147 mm.

1260 and 1261. Nabatas Point, Samar Island. July 24, 1909. Length 129 to 147 mm.

5764. Port Capunuypugan, Mindanao. May 10, 1908. Length 137 mm.

771 to 774. Port Uson, west of Pinas Island. December 17, 1908. Length 116 to 128 mm. [927].

541 to 544, 1171. San Juanico Strait. April 13, 1908. Length 72 to 90 mm.
4721. Tobea Island. December 14, 1909. Length 98 mm.
3877 (D. 5608). Binang Unang Island. November 18, 1909. Length 59 mm.
4322 U.S.N.M. No locality. National Institute. Length 112 to 113 mm. Two examples.
56326 U.S.N.M. Cavite, Philippines. Dr. G. A. Lung. Length 170 mm.
84205 U.S.N.M. Cebu. Dr. F. Baker. Length 113 mm.

Genus CHELMONOPS Bleeker

Chelmonops Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 304. Type *Chaetodon truncatus* Kner, orthotypic.

Snout produced, but shorter than in *Chelmo* and dorsal with 11 spines. Australia.

CHELMONOPS TRUNCATUS (Kner)

Chaetodon truncatus Kner, Sitz. Ber. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 34, 1859, p. 442, pl. 2. Sydney; Reise Novara, Fische, 1865, p. 103 (note).

Chelmo truncatus Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 516 (copied).—Waite, Rec. Austral. Mus., vol. 3, 1900, p. 203 (Lord Howe Island).

Chelmonops truncatus Ogilby, Mem. Queensland Mus., vol. 5, 1916, p. 183 (off Double Island Point, Queensland).—McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, 1916, p. 194 (off Double Island Point); Australian Zool., vol. 2, pt. 2, 1922, p. 91, pl. 27 (New South Wales).

Chelmo trochilus Günther, Ann. Mag. Nat. Hist., London, ser. 4, vol. 14, 1847, p. 368. Australia.

Chelmonops trochilus Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 17, pl. 1, fig. 2 (Sydney).

D. XI, 26 or 27; A. III, 18 to 21; scales 43 to 55. Whitish with 5 black transverse bands and grayish band in each interspace. Reaches 150 mm.

Queensland, New South Wales, Lord Howe Island.

Genus FORCIPIGER Jordan and Evermann

Forcipiger (Jordan and McGregor) Jordan and Evermann, Bull. U. S. Nat. Mus., No. 47, pt. 2, 1898, p. 1671. Type *Chaetodon longirostris* Broussonet, designated by Jordan and McGregor, Rep. U. S. Fish. Comm., pt. 24, 1898 (1899), p. 279.

Related to *Chelmo* and *Chelmonops* but differing from both in the greatly longer high spinous dorsal, spines 12 or 13.

FORCIPIGER LONGIROSTRIS (Broussonet)

Chaetodon longirostris Broussonet, Descr. Ichth., 1782, no pagination, plate. Pacific Ocean near Society and Hawaiian Islands.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1264 (Pacific Ocean).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 438 (on Broussonet).—Schneider, Syst. Ichth. Bloch, 1801, p. 231 (Pacific Ocean).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 453, 473 (Great Ocean).—Cuvier, Règne Animal, vol. 2, 1817, p. 331;

Règne Animal, vol. 2, ed. 2, 1829, p. 334; Hist. Nat. Poiss., vol. 7, 1831, p. 89, pl. 175 (Society Islands, Hawaii, East Indies, Mauritius).

Chetodon longirostris Bonnaterre, Tabl. Ichth., 1788, p. 86, pl. 47, fig. 176 (Pacific Ocean).

Chelmo longirostris Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 38 (Amboina); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 48 (Hawaii, Society Islands, Paumotus, Friendly Islands, Kingsmills).—Castelnau, Res. Fish. Australia (Victoria Rec. Philadelphia Exhib.), 1875, p. 14 (Cape York, Queensland).—Day, Fishes of India, pt. 1, 1875, p. 106.

Chelmon longirostris Day, Fauna Brit. India, vol. 2, 1889, p. 10.

Prognathodes longirostris Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 23, pl. (4) 366, fig. 5 (Ternate, Amboina, Ceram, Nassa Laut, Banda).

Forcipiger longirostris Fowler, Proc. Acad. Nat. Sci., Philadelphia, 1900, p. 512 (Hawaiian Islands).—Weber, Siboga Exped., vol. 57, 1913, p. 310 (Banda).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 8 (Matupi, New Guinea, Mauritius, Ralum, Tsingtau, Mysol, Jaluit).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 27 (Honolulu).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Wake Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 16, pl. 3, fig. 2 (Hamilo and Tagapula).

Chelmon rostratus (not Linnaeus) Thiollière, Fauna Woodlark, 1857, p. 166 (Woodlark Island).

Chelmon lol (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 166 (name in synonymy).

Forcipiger flavissimus Jordan and McGregor, Rep. U. S. Fish Comm., pt. 24, 1898 (1899), p. 279. Clarion, Socorro and San Benedicto Islands, Revillagigedo Archipelago.—Jordan and Evermann, Bull. U. S. Nat. Mus., No. 47, pt. 2, 1898, p. 1671 (Clarion and Socorro Islands).

Depth 2⅛ to 2½; head 1⅞ to 2¼, width 3⅞ to 5½. Snout 1⅘ to 2⅖ in head; eye 4⅔ to 7⅘, 2¾ to 5¼ in snout, greater than interorbital; maxillary ⅔ to ¾ in snout, 1⅞ to 2⅞ in head; interorbital 5¾ to 8½, slightly elevated convexly. Gill rakers 4+11, short points, ⅕ of gill filaments which 1¼ in eye.

Scales 63 to 75 in lateral line to caudal base; 12 or 13 scales above lateral line, 29 to 31 below. Scales with 8 to 11 basal radiating striae; apical denticles 38 to 48, with 3 to 11 transverse series of basal elements; circuli fine.

D. XI or XII, 22, i to 24 i, fourth spine 1⅔ to 2½ in head, first ray 1¾ to 3¾; A. III, 17, i or 18, i, third spine 1⅞ to 2½, first ray 1⅖ to 2½; caudal with hind edge little emarginate obliquely, so upper rays longer, 1⅞ to 3⅖; least depth of caudal peduncle 5¾ to 9¼; pectoral 1⅛ to 1¾; ventral 1¼ to 1⅞.

Largely uniform dull brown. Head and breast little darker than rest of body. Broad blackish predorsal band down to eye and over all of postocular to head and pectoral axil, also extended forward as narrow blackish band on preorbital to front of snout, then united as median superior band on rostrum above. Soft dorsal and anal each with submarginal deep brown line, on last anal rays terminally forming black rounded spot but little smaller than eye. Caudal brown. Paired fins quite pale.

Mauritius, East Africa, India, East Indies, Philippines, Queensland, Melanesia, Micronesia, Polynesia, Hawaii. While largely quite uniform in color pattern the species varies greatly in the length of the rostrum.

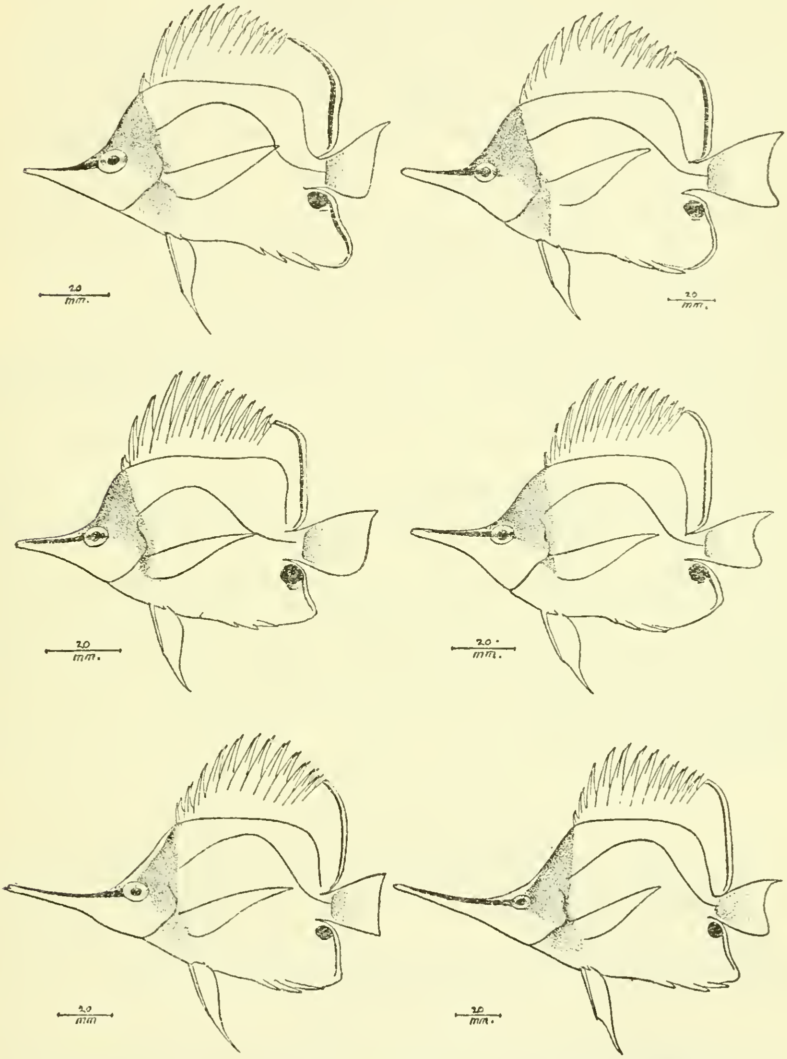
20 mm.
20 mm.
20 mm.
20 mm.
20 mm
20 mm.

Fig. 2.—Rostral variation with age of *Forcipiger longirostris* (Broussonet)

Forcipiger flavissimus is said to differ chiefly in coloration, the much larger anal blotch not ocellated as in the *Forcipiger longirostris*, besides vertically oblong. Its body is said to be much deeper, the depth given as 2. At best it would appear to us as a variation, for the depth of examples both from our present series and extensive material from Oceania reveal very great variation in the beak, so that the proportions in comparative body depth would greatly fluctuate.

849. Baganga Bay. March 13, 1908. Length 112 mm.
9672. Cagayanes Island. March 31, 1909. Length 154 mm.
716. Caracaran, Batan Island. June 8, 1909. Length 133 mm.
275. Paluan Bay, Mindoro. December 11, 1908. Length 140 mm.
989. Port Matalvi. November 23, 1908. Length 140 mm.
409 to 411, 3918, 3919, 4603. Port Palapag. June 3, 1909. Length 112 to 130 mm.
581 to 583, 698. Sablayan, Mindoro. December 12–13, 1908. Length 126 to 140 mm.
1006. Danawan Island and Si Amil Island. September 27, 1909. Length 138 mm.
9718. Kayoa Island. November 29, 1909. Length 144 mm.
351 and 9664. Mabul Island. September 29, 1909. Length 145 to 160 mm.
3931. Makyan. November 29, 1909. Length 131 mm.
4803. Powati Harbor, Makyan Island. November 20, 1909. Length 147 mm.
4811 and 9877. Powati Harbor. November 28, 1909. Length 96 to 125 mm.
4726. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 144 mm.
4767 [2063]. West of Malibagu Point, Celebes. November 21, 1909. Length 165 mm.
4801. Limbe Strait, Celebes. November 10, 1909. Length 154 mm.
48528 U.S.N.M. Socorro Island. R. C. McGregor. Type of *Forcipiger flavissimus.*
52282 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 123 mm.
55107 U.S.N.M. Honolulu. *Albatross* collection. Length 153 to 183 mm. [2526].
55477 U.S.N.M. Honolulu, Hawaiian Islands. 1902? Length 155 mm. [558].
58520 U.S.N.M. Honolulu. E. L. Berndt. Length 120 mm.
63632 U.S.N.M. Honolulu. E. L. Berndt. Length 105 to 172 mm. Two examples.
65838 U.S.N.M. Fakarava. *Albatross* collection. Length 20 mm.

Genus CORADION Kaup

Coradion Kaup, Arch. Naturg., vol. 24, abth. 1, 1860, p. 146. Type *Chaetodon chrysozonus* Cuvier, designated by Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 253.

Differs from *Chaetodon* in its imperfect dentition, soft dorsal and anal bases nearly vertical and fewer anal spines, 8 to 10.

ANALYSIS OF THE SPECIES

a^1. Caudal peduncle with dark or black bar or band; anterior broad dark transverse band with median pale dividing line or band parallel above; dark ocular band not on breast.
  b^1. Dorsal only with ocellus ---------------------------------- chrysozonus
  b^2. Soft dorsal and anal each with ocellus ---------------------- melanopus
a^2. Caudal peduncle uniformly pale, without dark band or blotch; anterior broad body band entire; dorsal only with ocellus ------------- desmotes

CORADION CHRYSOZONUS (Cuvier)

Chaetodon chrysozonus (Kuhl and Van Hasselt) Cuvier, Hist. Nat. Poiss., vol. 7,1831, p. 82. Java.—Valenciennes, Règne Animal Cuvier, Poiss., Ill., 1839, pl. 37, fig. 2 (Java).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 34 (Amboina, China).—Kner, Reise Novara, Fische, 1865, p 101 (Java).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14. 1885, p. 17 (Manado, Celebes).

Coradion chrysozonus Kaup, Arch. Naturg., abth. 1, 1860, p. 146 (Java).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 25, pl. (14) 376, fig. 5 (Java, Celebes, Amboina).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 487 (Luzon, Manila).—Weber, Siboga Exped., vol. 57, 1913, p. 309 (Macassar).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 40 (Ralum and Java).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 70 (Calapan, Bulalacao, Masbate, Tagapula, Gigantangan, New Washington, Estancia, Bantayan).

Chaetodon enneacanthus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 82. No locality.

Chaetodon labiatus (Kuhl and Van Hasselt) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 83. Java.

Chaetodon guttatus (not Bloch) Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 71. Indian Ocean.

Coradion altivelis McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, 1916, p. 191, pl. 56, fig. 1. Wide Bay, Queensland.

Depth 1⅖ to 1⅗; head 2½ to 2⅞, width 2⅒ to 2⅖. Snout 2⅗ to 3⅛ in head from snout tip; eye 2¾ to 3⅘, greater than snout in young to 1⅖ with age, equals interorbital; maxillary ⅗ to ⅔ in snout, 4 to 4⅔ in head; interorbital 3⅛ to 4, broadly convex. Gill rakers 3+6 short feeble points, ⅛ of gill filaments, which 1⅕ in eye.

Scales 34 to 39 between gill opening and caudal base; tubes 42 to 46 in lateral line to caudal base; 9 or 10 scales above lateral line, 22 to 26 below. Scales with 10 or 11 basal radiating striae; apical denticles 35 to 93, with 4 series of transverse basal elements; circuli fine.

D. IX, 28, I or 29 I, last spine 1⅛ to 1⅖ in total head length, first ray 1⅛ to 1⅖; A. III, 19, I to 21, I, last spine 1½ to 1¾, third ray 1⅓ to 1⅖; least depth of caudal peduncle 2¾ to 3⅓; caudal 1⅖ to 1½, hind edge convex; pectoral 1¼ to 1⅖; ventral 2⅕ to 2⅘ in combined head and body.

Brown generally. Muzzle whitish, snout above brownish. Broad blackish brown band from predorsal down through eye and below, forms broad band on breast and chest medianly, though not quite reaching ventrals. Posteriorly broad white band comprising rest of head and all of side of breast. Broad deep brown band from front half of dorsal to ventral origin and vent; posteriorly narrower whitish parallel band; from soft dorsal to anal another brown band, in young extends down narrowed to ends of first anal rays; front of caudal peduncle with transverse pale band, followed by black narrower band at caudal base, which formed as dark vertical ellipse in young. First dark broad transverse band of body with vertical gray band from dorsal till opposite pectoral base, also little before middle in width of band. Each row of scales on body with median pearly spot, so arranged as to form longitudinal whitish streaks conforming to rows of scales, and crossing from first dark band to end of second or at beginning of caudal peduncle; spots larger on costal region. Second membrane of spinous dorsal black. Soft dorsal and anal with gray border, and each with pair of close-set deep brown submarginal lines. Ventrals blackish, pectorals and caudal pale brown. At middle of soft dorsal round black spot, larger and ocellated with white in young.

East Indies, China. Bleeker's figure of this species has been transposed with *Chaetodon rafflesi*. We can not find that *Coradion altivelis* McCulloch is distinct from the present species.

3891. Bumbum Island. September 25, 1909. Length 122 mm.

A1517. Daisy Islet, west of Bumbum Island. January 6, 1910. Length 134 mm.

1180 and 1197. Jolo market. March 7, 1908. Length 82 to 118 mm.

260. Tutu Bay, Jolo, second anchorage. September 19, 1909. Length 122 mm.

4754. Tobea Island. December 14, 1909. Length 163 mm.

567, A888, A897. Limbe Strait, Celebes. November 10, 1909. Length 130 to 159 mm. Four examples.

448 and A1189. Gane Road, Gillolo Island. December 1, 1909. Length 123 to 133 mm.

1584 [129] (D. 5136). February 14, 1908. Length 90 mm. Silvery white, crossed by 4 dark umber bands on back, first 3 merging into black below. An additional narrow median umber and black stripe on snout and forehead. Ocular band umber above, black beginning just above eye, two uniting and continued on breast nearly to pectoral and ventral base; width ⅔ of eye. Second band wide as eye begins below first dorsal spine, passes through pectoral base and involves ventral base, joins third band on belly which begins at bases of fifth to tenth dorsal spines. Fourth band begins at middle of soft dorsal, passes to middle of soft anal slightly backward and indistinctly bordered narrowly with gray. Black band on caudal peduncle at caudal fin base. Centers of scales below lateral line with golden yellow spots, forming series of narrow longitudinal lines most distinct behind head. Tip of chin dusky. Dorsal with colors of body, tips of spines and membranes except second spine lemon yellow, which merges to hyaline and forms marginal band round rest of fin; narrow pearl gray band begins on fourth dorsal spine submarginally, defined by darker border; second spine black. Median ocellus on soft dorsal, central area about size of eye black bordered with pearl gray. Anal like dorsal, but without black spine or ocellus. Caudal gray. Pectoral hyaline. Ventral black.

1590 and 1591 (D. 5145). February 15, 1908. Length 60 to 77 mm.

1632 (D. 5146). February 16, 1908. Length 50 mm.

1793 (D. 5151). February 18, 1908. Length 70 mm.

1798 (D. 5138). February 14, 1908. Length 72 mm.

2018 to 2026, A449 (D. 5147). February 16, 1908. Length 67 to 110 mm.

CORADION MELANOPUS (Cuvier)

Chaetodon melanopus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 84. Moluccas.

Coradion melanopus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 26 (Amboina, Ceram).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 42 (East Indies; Ralum).

Chaetodon festivus Desjardin, Proc. Zool. Soc. London, 1833, p. 177. Mauritius.

Coradion chrysozonus (part) Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 146.

Megaprotodon strigangulus (not Gmelin) Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, pl. (13) 375, fig. 4 (not 1).

Differs from *Coradion chrysozonus* in dark ocellus on soft dorsal and another on soft anal.

CORADION DESMOTES Jordan and Fowler

Coradion desmotes Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 539, fig. 5. Nagasaki, Japan.—Smith and Pope, Proc. U. S. Nat. Mus., vol. 31, 1907, p. 480 (Urado).

Greatly like *Coradion chrysozonus* which usually has the anterior broad brown band on the body divided, at least above, by a pale intersecting parallel narrow band or line. The present species differs chiefly in the pale, uniform caudal peduncle.

59696 U.S.N.M. Urado, Japan. Dr. H. M. Smith. Length 133 mm.
87031 U.S.N.M. Foochow, China. Sowerby. Length 60 mm.

Genus PARACHAETODON Bleeker

Parachaetodon Bleeker, Arch. Néerland. Sci. Nat., vol. 11, 1876, p. 303. Type *Platax ocellatus* Cuvier, monotypic.

Dorsal spines graduated to last, which longest, all small. Soft dorsal higher than spinous fin and anterior rays elevated, fin graduated low posteriorly. Body deep and back elevated.

PARACHAETODON OCELLATUS (Cuvier)

Platax ocellatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 229. No locality (collection Zool. Soc. London).

Parachaetodon ocellatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 24, pl. (15) 377, fig. 4 (Pinang, Singapore, Bintang, Banka, Java, Celebes, Halmahera, Ternate, Buru, Amboina, Ceram, Waigiu, Philippines).—Jordan and Seale, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 789 (Negros); Bull. Bur. Fish., vol. 26, 1906 (1907), p. 33 (Cavite).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Amboina).—Weber, Siboga Exp., vol. 57, Fische 1913, p. 309 (Macassar, Saleyer).—McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, October 31, 1916, p. 190 (Batavia, Java; Manila; Queensland, Sydney); Austral. Zoologist, vol. 2, pt. 3, February 10, 1922, p. 92, pl. 27, fig. 237*a* (New South Wales).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 18 (Amboina, Celebes, Singapore).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 18 (Polillo Island, Lucena, Calapan, Estancia, Buenavista, Calbayog, Tagbilaran).

Chaetodon ocellatus Day, Fauna Brit. India, vol. 2, 1889, p. 10.

Chaetodon oligacanthus Bleeker, Nat. Tijds. Nederland. Indië, vol. 1, 1850, p. 105. Batavia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, pp. 34, 516 (Malayan Peninsula).—Kner, Reise Novara, Fische, 1865, p. 102 (Madras).—Günther, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—Day, Fishes of India, pt. 1, 1875, p. 109.—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Singapore, Amboina).—Macleay, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 351 (Port Darwin).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 360 (Port Darwin).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Selila).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 487 (Samar and Cebu).—Düncker, Mitt. Nat. Mus. Hamburg, vol. 21, 1903 (1904), p. 151 (Singapore).

Chaetodon oligacanthus Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Cebu).

Tetragonoptrus oligacanthus Bleeker, Nederland. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).

Chaetodon townleyi De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1885, p. 454. Moreton Bay, Queensland.

Depth 1¼ to 1½; head 2⅞ to 3⅛, width 2 to 2⅛. Snout 3 to 3⅒ in head from snout tip; eye 3⅒ to 4, 1 to 1⅓ in snout, 1 to 1⅕ in interorbital; maxillary ⅔ to ¾ in snout, 3½ to 4 in head; interorbital 3⅛ to 3⅖, broadly convex. Gill rakers 5+9, short points, ⅕ of gill filaments which 1⅓ in eye.

Scales 39 to 42 between gill opening and caudal base; tubes 32 to 34 in lateral line; 14 or 15 scales above lateral line, 27 or 28 below. Scales with 9 or 10 basal radiating striae; apical denticles 50 to 96, with 10 to 15 transverse series of basal elements; circuli fine.

D. VI, 28, i or 29, i, last spine 1⅓ to 1⅖ in total head length, first ray 2⅓ to 3; A. III, 19, i or 20, i, third spine 1⅘ to 2⅛, first ray 1⅖ to 1¾; least depth of caudal peduncle 2⅓ to 2¾; caudal 1¼ to 1⅖, hind edge slightly double concave; pectoral 1⅕ to 1⅓; ventral 2⅞ to 3½.

Light brown, greater part of sides below whitish. Five transverse brown bands slightly inclined posteriorly from vertical. Narrow dark band through eye scarcely wider than pupil, from supraoccipital down on side of chest. Second band from predorsal, includes hind edge of gill opening and humeral region, pectoral base into postventral region. Third band from spinous dorsal to spinous anal. Fourth band widest, from front of soft dorsal to anal medially. Black ocellus large as eye at base of soft dorsal anteriorly within middle of fourth dark band. Last dark band extends across caudal peduncle, with white marginal line in front and behind. Fins all pale or dull brown, inner ventral border deeper brown.

India, East Indies, China. Easily known by its greatly elevated soft dorsal anteriorly. Besides the specimens listed below is a small one but 15 mm. long from Port Dupon, Leyte, obtained May 6, 1908, evidently the *Tholichthys* stage of the present species.

Eleven examples (*Tholichthys* stage). Port Dupon. March 17, 1909. Length 12 to 16 mm.

One example. Below mouth of Mindanao River, Cotabato, Mindanao. May 20, 1908. Length 35 mm.

A449. Bubuan Island, Jolo. February 16, 1908. Length 108 mm. (D. 5147).

753. Buang Bay, Talajit Island. March 5, 1909. Length 147 mm.

One example. Canmahala Bay. March 11, 1909. Length 25 mm.

7514. Endeavor Strait. December 22, 1908. Length 170 mm.

13987. Iloilo market. May 31, 1908. Length 91 mm.

1197. Jolo market. March 6, 1908. Length 84 mm.

1180. Jolo market. March 7, 1908. Length 116 mm.

4784. Manila market. April 28, 1908. Length 78 mm.

7728. Manila market. March 20, 1908. Length 142 mm.

567 and A897. Limbe Strait, Celebes. November 10, 1909. Length 128 to 160 mm.

417 and 418. Great Tobea Island. December 15, 1909. Length 113 to 130 mm.

52033 U.S.N.M. Southern Negros. Dr. Bashford Dean 1901. Length 85 mm.

36319 U.S.N.M. Cavite. G. A. Lung. Length 34 to 89 mm. Four examples.

Genus CHAETODON Linnaeus

Chaetodon Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 272. Type *Chaetodon capistratus* Linnaeus, designated by Jordan and Gilbert, Bull. U. S. Nat. Mus., No. 16, 1883, p. 614.

Chaetedon Scopoli, Introd. Hist. Nat., 1777, p. 457. Atypic. Type *Chaetodon capistratus* Linnaeus.

Tetragonoptrus Walbaum, Arted. Pisc., vol. 3, 1792, p. 583. Atypic. Type *Chaetodon striatus* Linnaeus, designated by Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 305.

Rabdophorus Swainson, Nat. Hist. Anim., vol. 2, 1839, pp. 170, 211. Type *Chaetodon ephippium* Valenciennes, monotypic.

Megaprotodon Guichenot, Rev. Zool., 1848, p. 12. Type *Chaetodon bifascialis* Cuvier, monotypic.

Citharoedus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 141. Type *Chaetodon meyeri* Bloch, designated by Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 305.

Eteira Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 147. Type *Chaetodon triangularis* Rüppell, designated by Jordan, Genera of Fishes, pt. 3, 1919, p. 297.

Linophora Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 155. Type *Chaetodon auriga* Linnaeus, designated by Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 306.

Sarothrodus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 238. Type *Chaetodon striatus* Linnaeus, virtually (as *Sarothrodus* Gill proposed to replace *Chaetodon* Linnaeus).

Tholichthys Günther, Ann. Mag. Nat. Hist., ser. 1, vol. 1, 1868, p. 457. Type *Tholichthys osseus* Günther, monotypic (larval).

Hemichaetodon Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 305. Type *Chaetodon capistratus* Bloch, orthotypic.

Chaetodontops Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 305. Type *Chaetodon collaris* Bloch, orthotypic.

Lepidochaetodon Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 306. Type *Chaetodon unimaculatus* Bloch, orthotypic.

Oxychaetodon Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 306. Type *Chaetodon lineolatus* Cuvier, orthotypic.

Gonochaetodon Bleeker, Arch. Néerland. Sci. Nat. Harlem, vol. 11, 1876, p. 306. Type *Chaetodon triangulum* (Van Hasselt) Cuvier, orthotypic.

Anisochaetodon Klunzinger, Fische Roth. Meer., 1884, p. 54. Type *Chaetodon auriga* Forskål, designated by Jordan, Genera of Fishes, pt. 4, 1920, p. 429.

Osteochromis Franz, Abh. Bayer. Akad. Wiss., suppl., vol. 1, 1910, p. 52. Type *Osteochromis larvatus* Franz, monotypic.

Tifia Jordan and Jordan, Mem. Carnegie Mus., vol. 10, 1922, p. 60. Type *Chaetodon corallicola* Snyder, orthotypic.

Body short, deep, very strongly compressed, especially above and behind. Caudal peduncle short. Head small, compressed. Mouth very small, terminal. Jaws with long, slender, flexible, bristlelike teeth. Vomer sometimes with teeth. Preopercle entire or nearly so, without spine. Gill openings rather narrow, membranes narrowly joined to isthmus. Branchiostegals 6. Head almost entirely scaly. Trunk with rather large ctenoid scales, somewhat irregularly arranged. Lateral line curved, high, parallel with back. Dorsal fin single, continuous, not notched, spinous part longer than soft. Dorsal spines about 13, not graduated, some of middle ones longer than last. Last soft dorsal rays usually rapidly shortened, some occasionally filamentous. Anal like soft dorsal, with 3 or 4 strong spines. Caudal fan shaped.

A large genus of beautiful reef fishes of the tropical seas, mostly living in the coral reefs of the Indo-Pacific. They are extremely active and glide through the water with the greatest ease, often quickly flashing their brilliant bodies.

In the arrangement of the species we have largely followed Ahl.

The following based on a young example is hardly identifiable:

Chaetodon aphrodite Ogilby, Mem. Austral. Mus., vol. 2, 1889, p. 55, pl. 3, fig. 2. Lord Howe Island.

Black ocular bar. White blotch below spinous dorsal front. Whitish vertical band from base of soft dorsal anteriorly to middle of tail. Large oval black spot between 6 to 16 dorsal rays, below which brown band suffused over entire anal base. Caudal gray, with narrow dark brown basal band. Length 47 mm. (Ogilby.)

We have examined the following examples of unidentifiable *Tholichthys* stage:

1 example. Mabul Island. September 29, 1909. Length 20 mm. (D. 5588).
1 example. Nogas Point. February 5, 1908. Length 20 mm. (D. 5129).

ANALYSIS OF THE SPECIES

I. Rows of body scales on lower portion of body, disposed obliquely outward, horizontal or downward, often an indication of their upward disposition, not to angle of 45°; dorsal spines 10 to 16; anal spines 3 to 5.

- a^1. Body ovoid; scales regularly rounded; scale rows of lower half of body horizontal or but slightly inclined upward posteriorly.
  - b^1. CITHAROEDUS. Spinous dorsal but slightly longer than soft fin, spines 12; soft dorsal and anal obtusely rounded; scales 55; front profile of head very obtuse.
    - c^1. Head 3 to 3¼; sharply defined black longitudinal bands, narrower than interspaces, median recurved and those on soft dorsal and anal semilunar ---------- **meyeri**
    - c^2. Head 3 to 3¼; dark longitudinal diffuse bands, broader than interspaces and all but slightly curved ---------- **ornatissimus**
  - b^2. RABDOPHORUS. Spinous dorsal nearly twice length of soft fin; spines 12 to 16.
    - d^1. Dark or black ocular band present.
      - e^1. Posteriorly dark line parallel with ocular band from front of spinous dorsal vertically down on head or front of side, usually narrower than ocular band.
        - f^1. No large white bordered black blotch on back embracing soft dorsal; dorsal rays 20 to 23.
          - g^1. Dorsal and anal each with broad black basal band, former also with 2 narrower longitudinal dark bands; caudal with black transverse band; anal rays 18 to 21 ---------- **trifasciatus**
          - g^2. Vertical fins black, edged white; anal rays 22 to 28 ---------- **melapterus**
        - f^2. Large white bordered black blotch on back posteriorly embraces soft dorsal; dorsal rays 23 to 26 ---------- **ephippium**
      - e^2. No dark vertical line behind or parallel with dark ocular band.
        - h^1. Body without transverse broad black bands.
          - i^1. Two blue lines curve down from shoulder to front of anal; black blue edged ocellus on back below junction of dorsals ---------- **bennetti**
          - i^2. No blue lines from shoulder to anal.
            - j^1. Black blotch on back or on caudal peduncle.
              - k^1. Black blotch, greatly larger than eye, on back below juncture of dorsals.
                - l^1. No black blotch on caudal peduncle; anal spines 3 ---------- **speculum**
                - l^2. Caudal peduncle with black blotch; anal spines 4 ---------- **maculiceps**
              - k^2. No black blotch below juncture of dorsals.
                - m^1. Black ocellus, little larger than eye at front of caudal peduncle; anal spines 4 or 5 ---------- **plebeius**
                - m^2. No black band on caudal peduncle; anal spines 3 ---------- **decoratus**
            - j^2. No black blotch on back or on caudal peduncle.

n^1. Each scale on trunk and tail with black spot ---------- **semeion**

n^2. Scales without black spots.

o^1. Dorsal spines 15; soft dorsal and anal and body between brownish black; 6 oblique dark stripes descend forward; fins colorless ---------- **blackburnii**

o^2. Dorsal spines 12; vertical fins with white edges and dark submarginal lines.

p^1. Belly with 3 or 6 longitudinal yellow stripes ---------- **leucopleura**

p^2. Dull band from above caudal peduncle towards anal front basally ---------- **leucopygus**

h^2. Body with 5 broad black transverse bands, wider than interspaces ---------- **howensis**

d^2. No dark ocular band.

q^1. Body without blue longitudinal lines.

r^1. Scales yellow, each bordered broadly with deep brown to dusky ---------- **daedalma**

r^2. Scales without black borders.

s^1. Uniform brown; dorsal rays 19 or 20 ---------- **nippon**

s^2. Small dark blotch above orbit; 6 dark vertical streaks; dorsal rays 25 to 27 -- **xanthocephalus**

q^2. Body with 8 or 9 blue longitudinal lines; black blotch at last half of soft dorsal and on caudal peduncle ---------- **fremblii**

a^2. Body more rhomboid; scales regularly rounded and arranged in longitudinal rows; snout more or less pointed; dorsal spines 10 to 14, about 1½ times longer than soft rays; anal spines 3; soft dorsal and anal obtusely rounded.

b^1. CHAETODON. Horizontal or but little inclined rows of scales below lateral line.

t^1. Black or dark ocular band present, at least complete on cheek.

u^1 Body without 8 narrow black transverse bands.

v^1. No parallel dark band posterior to ocular band and extending from upper end of gill opening to pectoral base and belly.

w^1. A black predorsal spot; black ocular band below eye in cheek only; black band from base of soft dorsal to anal base; soft dorsal and anal edged black. **flavirostris**

w^2. No black predorsal spot; ocular band complete.

x^1. Broad oblique brown band from nape toward but not quite to soft anal; also second parallel brown band along back to lower side of tail ---------- **mitratus**

x^2. No broad dark oblique bands as above.

y^1. Body without 3 broad black vertical bands.

z^1. Soft dorsal with black white edged ocellus; sides with pale brown longitudinal lines--**modestus**

ocellus, at least in adult.

a^1. Caudal without black transverse band or crescent.

b^1. Black ocular band extends below head on breast; ventrals dark or blackish.

c^1. Large dark diffuse blotch from juncture of dorsals nearly to spinous anal----------------------------**trichrous**

c^2. No large dark median lateral blotch, which more or less mottled or blotched darker----------------------**corallicola**

b^2. Black ocular band not extending below head, not on chest or breast.

d^1. Back not especially darker and without 2 large white blotches each side.

e^1. Ten narrow vertical dark lines each made up of row of blackish spots------------------------------**miliaris**

e^2. Each scale with dark spot, forming inclined longitudinal rows--------------------------------**citrinellus**

d^2. Back dark olive with 2 large white blotches each side; blue line along dorsal and anal medially-----------**quadrimaculatus**

a^2. Caudal with black transverse band or crescent.

f^1. Body without transverse brown bands, but marked with small round dark spots.

g^1. Black spots form 6 longitudinal lines obliquely downward--------------------------------**maculatus**

g^2. Black spots somewhat as oblique lines on sides, but extremely fine and numerous all around body edges--**guttatissimus**

f^2. Body with 8 dark transverse bands of which ocular and caudal black; pale interspaces all spotted brown--**punctatofasciatus**

y^2. Body with 3 broad dark to black vertical bands.

h^1. Cross bands brown; each scale on under half of body with white spot------------------------**notophthalmus**

h^2. Cross bands black, sharply defined; no white spots on lower half of body---------------------**tricinctus**

h^3. Cross bands brown, second on body from oval blackish ocellus which includes last dorsal spine and first 3 soft rays--**marleyi**

v^2. A second dark band parallel with ocular band from upper end of gill opening to pectoral base and belly--------------------------**aureofasciatus**

v^3. Similar to *C. aureofasciatus* with the addition of 3 dark broad transverse bands on rest of body--------------------------------------**rainfordi**

u^2. Body with 8 black narrow transverse bands-------------------------**octofasciatus**

t^2. Ocular band as short yellow bar above and below eye, latter section with broad dark border; black predorsal spot; 7 broad dark oblique bands on side anteriorly all giving place to dark spots---**pelewensis**

b^2. CHAETODONTOPS. Body scales all in rows curved very obliquely upward; body more oval than rhomboid; spinous dorsal little more than half longer than soft fin; soft dorsal and anal obtusely rounded.

a^1. A black ocular band present, at least on cheek.
  b^1. Ocular band extends across interorbital or only as small blotch above eye.
    c^1. Broad white band posterior to ocular band and broad black band from shoulder toward last dorsal spines ---------- **lunula**
    c^2. White band posterior to ocular band and black shoulder blotch absent ---------- **adiergastos**
  b^2. Ocular band extends over predorsal nearly to spinous dorsal.
    d^1. Two dark spots, one above other, on caudal peduncle.
      e^1. Ventral black; dorsal and anal edges black, other fins yellowish ---------- **reinwardti**
      e^2. Ventral yellow; dorsal and anal yellow, soft fins each with submarginal dark line ---------- **melannotus**
    d^2. Caudal peduncle without dark blotches.
      f^1. Broad white band parallel posteriorly next to dark ocular band.
        g^1. Longitudinal dark lines on general pale coloration; dark ocular band not on chest; ventral pale ---------- **collare**
        g^2. Each scale on body with pale or yellow spot on general dark coloration; dark ocular band extends on chest; ventral black ---------- **reticulatus**
      f^2. No white band posterior and parallel with ocular band; broad dark band along dorsal bases curves down and forward along anal base; ocular band not on breast; ventral pale ---------- **selene**
    d^3. Large black white edged spot each side of tail, occupies its whole length; black ocular band extends on chest ---- **ocellicauda**
a^2. No ocular bar or dark markings on body; each scale with dark spot ---------- **nigropunctatus**
a^3. Body rhomboid; rather large section of body defined by enlarged scale formation, hind scale edges obliquely rounded, their longitudinal rows little defined but transverse rows pronounced; not over 45 scale rows between head and caudal base.
a^1. LEIPIDOCHAETODON. Large irregular scales only anterior on body, medially and posteriorly regularly rounded scales in regular longitudinal rows.
  b^1. Black ocular band not extending on chest.
    c^1. Dark spot on soft dorsal; no black blotch on back below last dorsal spines ---------- **dahli**
    c^2. No dark blotch on dorsal.
      d^1. Sides with vertical dark lines; round black spot on back below last dorsal spine ---------- **unimaculatus**
      d^2. Dark vertical lines follow courses of larger median lateral scales; no black spot on back ---------- **melanopoma**
  b^2. Black ocular band extends on chest; dark band from front of dorsal spines to ventral, which dark; tail dark; fins otherwise pale ---------- **kleinii**

a^2. LINOPHORA. Large irregular scales only on anterior and median part of body; snout pointed.
b^1. No black bands on back.
c^1. Soft dorsal with long, pointed filament; black ocular band from predorsal to gill opening ---------- **auriga**
c^2. Soft dorsal without filament.
d^1. Black ocular bar complete on head.
e^1. Dark band on soft dorsal and down over posterior part of anal ---------- **vagabundus**
e^2. No dark band on soft dorsal or anal.
f^1. Soft dorsal with black ocellus little larger than eye at angle; 4 narrow dark slightly inclined lateral bands ---------- **assarius**
f^2. No dorsal ocellus; large diffuse dark blotch at front of back; body scales all slightly edged darker forming somewhat reticulated pattern ---------- **rafflesii**
d^2. Black ocular bar incomplete on head, not to gill opening below and with blotch above close before spinous dorsal; no other bands; scale edges dark, form reticulating pattern ---------- **mertensi**
b^2. Back with 3 broad black blotches; narrow black bar above eye only or broken as 2 spots ---------- **argentatus**
a^3. OXYCHAETODON. Large irregular scales all over body, become small and regular only on breast; muzzle very pointed; scales not over 35.
a^1. Body not contrasted white anteriorly and dark posteriorly.
b^1. All posterior half of head black; head above and anteriorly yellow; no dark posterior bands; caudal with black submarginal band ---------- **semilarvatus**
b^2. Head not all black posteriorly.
c^1. Broad white band parallel behind black ocular band, which crosses interorbital but reaches gill opening below; dark dorsal band not crossing caudal peduncle ---------- **fasciatus**
c^2. No white band posteriorly parallel with dark ocular band.
d^1. Back without 2 broad black blotches.
e^1. Dark crescentic band along soft dorsal base extends down to anal base. with 18 or 19 black lines little inclined from vertical; no lunar black predorsal blotch ---------- **lineolatus**
e^2. Dark crescentic band along soft dorsal base, not reaching anal base; lunar black preorbital blotch ---------- **oxycephalus**
d^2. Back with 2 broad black blotches, sometimes united on spinous dorsal posteriorly; black blotch on caudal peduncle sometimes complete; about 20 black vertical lateral lines ---------- **falcula**
a^2. Front half of body white, posterior half dark brown, with fine vertical dark lines on scale rows; ocular band narrower than eye, not extending below cheek; caudal with dark crescent ---------- **mesoleucos**

II. Gonochaetodon. Scales of irregular form, rows with angle in middle of body depth; soft dorsal with angular point and hind edge vertical; snout short. **triangulum**

III. Megaprotodon. Body oval; scales obliquely rounded and rows form obtuse angle, 25; outer row of teeth larger; dorsal spines double length of soft rays; anal spines 4, rarely 5 -- **trifascialis**

CHAETODON MEYERI Schneider

Chaetodon meyeri Schneider, Syst. Ichth. Bloch, 1801, p. 223. Moluccas.—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 19 (Moluccas).—Valenciennes, Règne Animal, Poiss., Ill., 1839, p. 106, pl. 37, fig. 2.—Günther, Cat. Fish Brit. Mus., vol. 2, 1860, p. 13 (Celebes, Amboina, Java, Moluccas).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Naic, Cavite).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 305 (Banda; Timor).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 49 (Ralum, Jaluit, East Indies, Mikindani, East Africa).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar).

Citharoedus meyeri Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 141 (Moluccas).

Tetragonoptrus (*Citharoedus*) *meyeri* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 32, pl. (14) 37b, fig. 5 (Java, Celebes, Amboina, Ceram, New Guinea).

Holacanthus flavo-niger Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 529, 535, pl. 13, fig. 2. No locality.

Depth 1⅓ to 1⅖; head 3¼ to 3⅖, width 1¾ to 2. Snout 2⅞ to 3 in head; eye 3⅔ to 4, 1⅕ to 1⅖ in snout, 1¼ to 1½ in interorbital; maxillary ⅗ to ¾ in snout, 3⅖ to 3½ in head; interorbital 2⅗ to 2¾, convex. Gill rakers 6+20, short weak points, 7 in gill filaments, which 1⅕ in eye.

Scales 48 to 50 between gill opening and caudal base; tubes 32 to 38 in lateral line; 10 or 11 scales above lateral line, 27 or 28 below. Scales with 7 or 8 basal radiating striae; apical denticles 70 to 107, with 3 to 8 transverse series of basal elements; circuli fine.

D. XII or XIII, 23, I or 24, I, last spine 1 to 1⅘ in head, fourteenth ray 1⅖ to 1½; A. III or IV, 18, I to 20, I, third spine 1⅞ to 2⅛, twelfth ray 1⅖ to 1⅗; least depth of caudal peduncle 2¾ to 3; caudal 1⅖ to 1½, hind edge convex; pectoral 1⅒ to 1⅕; ventral 1⅛ to 1⅕.

Light brown with yellowish tints on side of abdomen and vertical fins. Blackish band meets its fellow at occiput, extends through eye, broadens on cheek and extends down over most of breast; margined in front and behind by yellow line which former broader and separates another narrower blackish band along upper lip and down over throat; yellow line from upper lip extends down separating broadly dusky or blackish lower lip. Black line extends down from first dorsal spine toward head; posteriorly continued along spinous dorsal and soft dorsal submarginally to ends of longer posterior dorsal rays. Black line usually arches forward from second dorsal spine, broadening vertically on postocular, down above ventral axil and then back along anal basally to longer posterior rays. Another parallels from posterior dorsal spines, extending to pectoral base from axil of which another line joins obliquely also from last dorsal spines; below arches little down and then up across caudal peduncle along caudal base. Two other parallel black lines arch from soft dorsal posteriorly and slope forward medianly on sides of body. Slight variations in juncture and extension occur in black lines, though in general of constant general pattern. White vertical line between 2 black lines postocular on head. Membranes of spinous dorsal usually, though not always, black. Anal with pale yellowish or whitish edge and broad submarginal deep brown band, edged narrowly blackish and medianly giving place to another black line, only posteriorly with yellow median longitudinal streak. Caudal with narrow whitish margin, then black submarginal line; another blackish line nearly median transversely. Paired fins brownish.

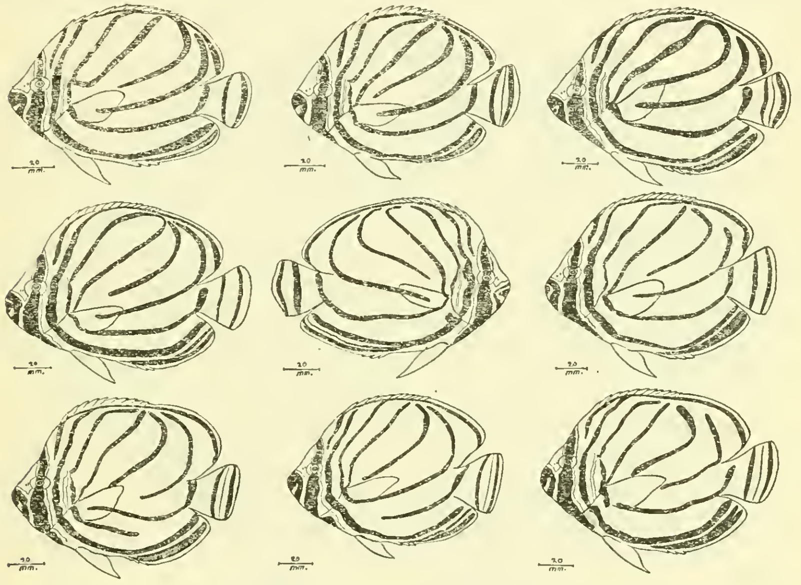

Fig. 3.—Variation of color markings of Chaetodon meyeri Schneider

Known only from the East Indies. It is a very striking species, its color pattern somewhat suggestive of that of *Chaetodon ornatissimus* or *Holacanthus imperator*.

A685, A706, A707, A722, A723. Danawan Island. September 26–28, 1909. Length 128 to 175 mm. Side gray, stripes black with slight yellowish shade at edges. Forehead pale slate gray; chin and upper lip black; circumoral ring black with pale or somewhat dusky lemon yellow interval between chin and circumoral ring and ocular band, none of red on side of head and opercle as shown in Bleeker's plate; band across opercle medially yellow, not whitish, width equal to yellow border of ocular band and placed midway between two adjacent black stripes. Nuchal region slightly washed with yellowish, quite distinct on nape. From pectoral base breast with yellowish ground color and abdominal region above black stripe broadly yellow, continued in breadth about equal to half black along anal base. Front of dorsal spines orange, membranes yellowish at tips, dark brown basally, merging into first stripe and under fourth spine joined by second in the interval between last 2 stripes and between second and third there are some scattered small orange dots, 1 or 2 behind third stripe. Edges of soft dorsal and anal dusky yellowish, adjoining on dorsal continuation of very dark brown on spinous fin, ending about midway on vertical edge, not reddish as shown in Bleeker's plate nor joined by any of other 4 stripes, but with yellow interval between and terminations; on soft fin ground color of interval pale dusky lemon with row of orange spots through median part somewhat as Bleeker shows; these arise at extreme lower part of vertical edge, thence curving to base through middle of interval; short similar row between fifth and sixth stripes on fin. Anal very similar to Bleekers's figure, broad band through outer half of fin brown and not red, interval between black stripes bright cadmium yellow, spines pale yellow. Caudal tip hyaline, black much as shown by Bleeker except median band slightly broader than terminal band, interval between with narrow orange line; similar but less bright line in interval between medial bar of tail and bar on caudal peduncle and orange spot on caudal peduncle above. Pectoral hyaline orange. Ventral with yellowish membranes.

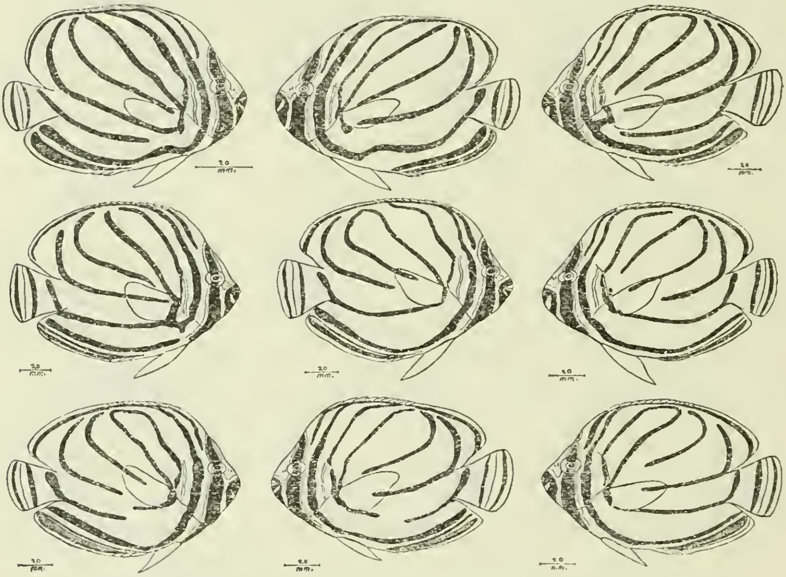

FIG. 4.—VARIATION OF COLOR MARKINGS OF CHAETODON MEYERI SCHNEIDER

552, 553, 555, A1222 to A1225. Gomomo Island. December 3, 1909. Length 82 to 153 mm.

A1140, A1147. Kayoa Island. November 29, 1909. Length 137 to 140 mm. Three examples.

352. Mabul Island. September 29, 1909. Length 120 mm.

475 to 478, A1077, A1090. Maitara Island. November 26, 1909. Length 112 to 147 mm. Eight examples.

A749 and A750. Sipadan Island. September 28, 1909. Length 141 to 150 mm.

A1324. Tifu Bay. December 10, 1909. Length 146 mm.

A1266. Uki, Bouro Island, Dutch East Indies. December 9, 1909. Length 148 mm.

A1504. Birabirahan Island, Borneo. December 31, 1909. Length 157 mm.

A1190. Gane Road, Gillolo Island. December 1 ,1909. Length 143 mm.

A1372. Basa Island, Celebes. December 17, 1909. Length 145 mm.

A1472. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 142 to 160 mm. Three examples.

479 and 480, 1055. Tidore Island, south of Ternate. November 24, 1909. Length 128 to 140 mm. Four examples.

562 to 564. Tidore Island. November 25, 1909. Length 136 to 142 mm.

CHAETODON ORNATISSIMUS Cuvier

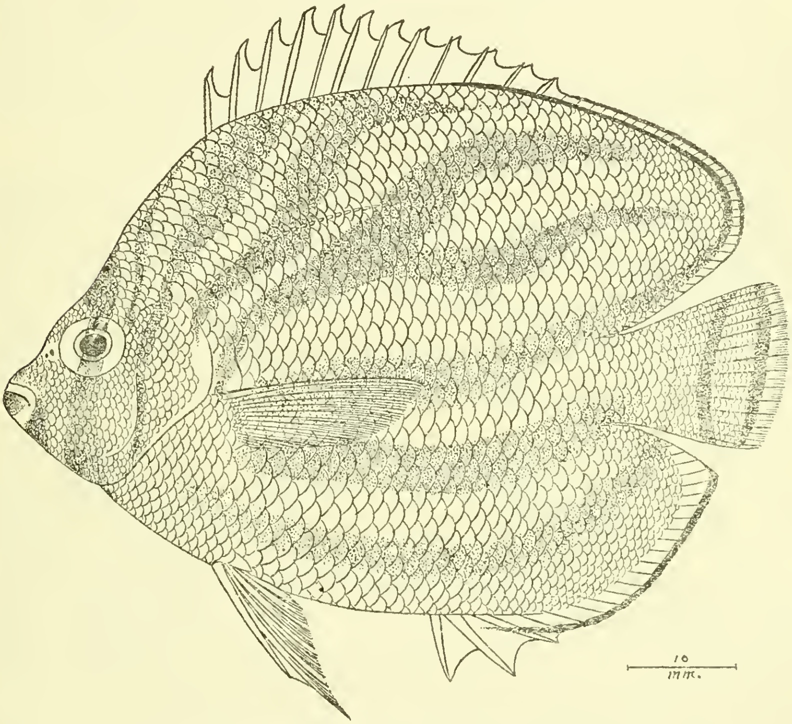

Fig. 5.—Chaetodon ornatissimus Cuvier. Young

Chaetodon ornatissimus (Solander) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 22. Tahiti.—Lesson, Voy. Coquille, Zool., vol. 2, pt. 1, 1830 (1831), p. 179, pl. 30 fig. 1 (Matavai Bay, Tahiti).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 15 (Amboina; type of *Chaetodon ornatus*).—Kner, Reise Novara, Fische, 1865, p. 98 (Tahiti).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 38, pl. 30, fig. B (Hawaiian Islands).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (copied).—Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 373, pl. 53 (Honolulu).—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 33 (Manila).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 27 (Honolulu), p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston Island, Wake Island).—Herre and Montal-

BAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 42, pt. 9, fig. 1 (Balinakan, Bennett, Quiminatin Islands).

Citharoedus ornatissimus KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 142 (Tahiti).

Tetragonoptrus (*Citharoedus*) *ornatissimus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 32, pl. (13) 375. fig. 2 (Amboina, New Guinea).

Chaetodon ornatus GRAY, Zool. Miscellany, 1831, p. 33. Hawaiian Islands.—GRIFFITH, Animal Kingdom Cuvier, Pisces, vol. 10, 1834, p. 323, pl. 20 (name only).

Chaetodon ornatissimus var. *kaupi* AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 52. Samoa, Ralum, Matupi.

Depth 1⅓ to 1⅖; head 3 to 3¼, width 1⅘ to 2. Snout 3 to 3⅛ in head from snout tip; eye 2⅘ to 3⅔, greater than snout in young to 1¼ with age, 1 to 1⅖ in interorbital; maxillary ¾ or to eye, 3⅛ to 3¾ in head; interorbital 2⅔ to 2⅘, broadly convex. Gill rakers 5+14, short points, ⅛ of gill filaments, which 1¼ in eye.

Scales 43 to 49 between gill opening and caudal base; tubes 23 to 43 in lateral line; 10 to 12 scales above lateral line, 24 or 25 below. Scales with 8 to 10 basal radiating striae; apical denticles 48 to 108, with 8 to 9 series of transverse basal elements; circuli fine.

D. XII, 24, I or 25, I, last spine 1⅖ to 1⅞ in total head length, tenth ray 1⅒ to 1⅖; A. III, 20, I or 21, I, last spine 1⅗ to 2, tenth ray 1⅓ to 1½; least depth of caudal peduncle 2⅖ to 2⅚; caudal 1⅖ to 1½, broadly convex behind; pectoral 1 to 1⅓; ventral 1 to 1⅕.

Brown generally, with broad yellowish-brown bands, slightly sloping down forward longitudinally, also each margined by slightly grayish line. Black supraoccipital band down to eye, then down across cheek to breast where meeting its fellow, width much less than eye and front and hind edges each with sulphur yellow line. Black narrow band submarginally along dorsal then down vertically along hind eye edge to gill opening; also 2 black vertical lines parallel on head, first from suprascapula down along and behind preopercle edge and other along hind opercle edge shorter. Black band over front of snout and down across throat, with yellow marginal line in front and behind. Upper lip yellow forming broad yellow band across chin leaving lower lip black. Interorbital brown. Edge of soft dorsal with narrow black line. Anal likewise, then submarginal broader buff line or band against which another black line. Caudal with very narrow whitish edge, broader deep brown submarginal band against which broad buff band, then broad, black transverse median band. Paired fins pale brownish.

East Indies, Polynesia, Hawaii. Examples vary as sometimes the bands may be asymmetrically broken. In small examples but 6 small and broader, dark bands and dark bands on caudal closer and median on fin.

739. Agojo Port, Catanduanes Island. June 10, 1909. Length 147 mm.
1183, 1538. Bolinao Bay. March 10, 1909. Length 138 mm.
1274 and 1275. Cabugan Island, Hinunangan. July 30, 1909.
769. Cebu market. March 19, 1909. Length 123 mm.
8759. Lahuy Island. June 11, 1909. Length 149 mm.
8451. Maribojoc, Bohol Island. March 25, 1909. Length 168 mm. Interorbital slate gray, other bars on head almost black. Yellow as pale sulphur and lateral bands bright orange, somewhat dusky along scales. First dorsal spine slightly orange.
1016. Maricaban Island. January 20, 1908. Length 50 mm.
6606 and 6607. Northwest point of Verde Island. July 22, 1908. Length 148 to 158 mm.
1325 and 9224. Opol, Mindanao. August 4, 1909. Length 128 to 153 mm.
7330. Pandan Island near Sablayan Bay, Mindoro. December 12, 1908. Length 148 mm. Bars of head alternately black and sulphur yellow. Interorbital area slate gray. Oblique body stripes orange, sometimes dusky, interspaces pale gray or white. Breast and belly sulphur yellow. Dorsal spines very pale orange, membranes pale dusky lemon, continued as inframarginal bar on soft dorsal and as marginal on vertical portion; black postocular bar runs along base of anterior spinous dorsal, rising to middle, continues on terminal portion of soft fin under yellow and returns at vertical edge, joins fourth oblique orange stripe; beneath fin pale soiled yellowish. Anal edge dark brown; inframarginal sulphur yellow bar continued on spinous portion occupying body of membranes; bronze orange bar through center of anal limited by blackish. Caudal very pale yellow with black median band and another submarginal to narrow hyaline edge. Pectoral rays pale dusky orange. Ventral pale orange.
7390. Port Caltom, Busuanga Island. December 15, 1908. Length 153 mm.
720 and 20435. Port Palapag. June 3, 1909. Length 93 to 120 mm.
1049. Sabtan Island. November 8, 1908. Length 148 mm.
A630. Simaluc Island. September 22, 1909. Length 154 mm.
A456. Tulnalutan Island. September 9, 1909. Length 156 mm.
A751. Sipadan Island. September 28, 1909. Length 148 mm.
A708. Danawan Island. September 27, 1909. Length 153 mm.
671. Waitara Island. November 26, 1909. Length 120 mm.
4828. Sadaa Island, Celebes. November 17, 1909. Length 71 mm.
481 and A1052. Tidore Island, south of Ternate. November 24, 1909. Length 133 to 145 mm.
11683 U.S.N.M. Nafa, Okinawa, Riu Kiu. *Albatross* collection. Length 122 mm.
20510 U.S.N.M. Hawaiian Islands. A. B. Steinberger. Length 178 mm.
52318 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 108 to 145 mm. Three examples.
52816 U.S.N.M. Hawaii. Bureau of Fisheries.
55479 U.S.N.M. Honolulu. Fur Seal Commission. Length 172 mm.
52816 U.S.N.M. Honolulu. Bureau of Fisheries 1901–02. Length 177 mm. [553].
58532 U.S.N.M. Honolulu. E. L. Berndt. Length 170 mm.

CHAETODON TRIFASCIATUS Mungo Park

Chaetodon trifasciatus MUNGO PARK, Trans. Linn. Soc. London, vol. 3, 1797, p. 34. Sumatra.—LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, pp. 462, 495 (Sumatra).—PLAYFAIR, Fishes of Zanzibar, 1865, p. 34 (Zanzibar).—DAY, Fauna Brit. India, vol. 2, 1889, p. 7.—STEINDACHNER, Abh. Senckenberg. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).—WAITE, Rec.

Austral. Mus., vol. 5, 1903, p. 32 (Lord Howe Island).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 544 (Padang).—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 33 (Cavite).—Jordan and Richardson, Bull, Bur. Fisher., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 304 (Karkaralong, Salayer, Binongka, Banda, Tual).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 56 (Samoa, New Guinea, New Pomerania, Ralum, Marshalls, Jaluit, Bismark Archipelago, New Mecklenberg, Amboina, Thalassia, Vulcan Island).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam), p. 28 (Honolulu), p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston Island).—Herre and Montalban, Philippine Journ. Sci., vol, 34, No. 1, September, 1927, p. 63, pl. 13, fig. 1 (Mariveles, Aloneros, Calapan, Bulalacao Bay, Tablas, Bantayan, Quiminatin, Puerta Princesa, Balabac, Cagayan, Basbas).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 286 (Philippines).

Tetragonoptrus (*Tetragonoptrus*) *trifasciatus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 35, pl. (15) 377, fig. 1 (Sumatra, Batu, Cocos, Java, Celebes, Flores, Solor, Timor, Halmahera, Ternate, Obi major, Ceram, Amboina, Harucu, Banda, Goram, Aru, Waigiu).—Bleeker, Verh. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 1 (Mauritius).

Choetodon (*Tetragonoptrus*) *trifasciatus* Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 254.

Chaetodon vittatus Schneider, Syst. Ichth. Bloch, 1801, p. 227. Sumatra (on Mungo Park).—Bennett, Proc. Comm. Zool. Soc. London, 1831, p. 61 (Mauritius).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 34 (Tahiti, Guam, Qualan, Bourbon, Madagascar, Mauritius, East Indies).—Lay and Bennett, Zool. Beechey's Voy., 1839, p. 61, pl. 17 (Byam Martin Island, Paumotus).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 23 (Ceram, Amboina).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 25; Mém. Soc. Hist. Nat. Cherbourg, vol. 2, ser. 2, 1866, p. 145 (Madagascar).—Klunzinger, Verh. zool.-bot. Ges. Wien, vol. 20, 1870, p. 782 (Koseir).—Capello, Jorn. Soc. Sci., Lisboa, 1871, p. 199 (Mozambique).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 41 (Paumotus).—Day, Fishes of India, pt. 1, 1875, p. 107, pl. 27, fig. 5.—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Diégo Suarez, Madagascar).

Citharoedus vittatus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 142.

Tetragonoptrus vittatus Bleeker, Nederland. Tijds. Dierk., 1863, p. 344 (Madagascar).

Chaetodon tau-nigrum Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 38. Guam.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 32 (copied).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 487 (copied).

Citharoedus taunigrum Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 142.

Chaetodon austriacus Rüppell, Neue Wirbelth., Fisch., 1835, p. 30, pl. 9, fig. 2. Djedda, Red Sea.

Citharodeus austriacus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 142 (Africa).

Chaetodon trifasciatus var. *austriacus* Klunzinger, Fisch. Roth. Meer., 1884, p. 55.

Chaetodon trifasciatus subsp. *austriacus* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 57 (Red Sea).

Chaetodon bellus (Solander) Lay and Bennett, Zool. Beechey's Voy., 1839, p. 61 (name in synonymy).

Chaetodon ovalis Thiollière, Fauna Woodlark, 1857, p. 164. Woodlark Island.

Chaetodon papek (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 164.

Chaetodon layardi Blyth, Prodr. Faunae Zeylon, Kelaart, Append., 1852, p. 50. Ceylon.

Chaetodon melapterus Guichenot, Notes I. Réunion, vol. 2, 1862, p. 6. Réunion.

Chaetodon klunzingeri Kosmann and Räuber, Zool. Ergebn. Reis. Roth. Meer, 1877, p. 13, pl. 2, fig. 11. Red Sea.

Chaetodon trifasciatus var. *arabica* Steindachner, Anz. Akad. Wien, Nachr. 39, No. 24, Nov. 20, 1902, p. 317. South Arabia (name only).—Steindachner, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 71, abth. 1, 1902, p. 138, pl. 2, fig. 3 (Makalla, South Arabia).

Chaetodon punctato-fasciatus (not Cuvier) Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).

Chaetodon trifasciatus subsp. *caudifasciatus* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 57. Padang, Siporab, Madagascar, Mozambique, German East Africa.

Depth 1½ to 1⅔; head 2⅗ to 3⅔, width 1⅗ to 1¾. Snout 3 to 3⅘ in head; eye 2½ to 3⅕, greater than snout, 1 to 1¼ in interorbital; maxillary ⅗ to ⅔ in snout, 3⅕ to 4 in head; interorbital 2⅔ to 3, broadly convex. Gill rakers 4 + 13, short points, ⅙ of gill filaments, which 1¼ in eye.

Scales 38 to 40 between gill opening and caudal base; tubes 26 to 30 in lateral line; 6 or 7 scales above lateral line, 13 or 14 below. Scales with 10 to 12 basal radiating striae; apical denticles 76 to 131, with 3 to 12 transverse series of basal elements; circuli fine.

D. XIII, 21, I or 22, I, fifth spine 1½ to 1⅗ in head, tenth ray 1⅗ to 1⅔; A. III, 19, I or 20, I, third spine 1⅗ to 2, third ray 1½ to 1⅔; least depth of caudal peduncle 2½ to 2⅘; caudal 1⅓ to 1½, hind edge convex; pectoral 1 to 1⅙; ventral 1⅛ to 1⅕.

Brown, pale to whitish on lower surface of head and abdomen. Each row of body scales with median dark to dusky streak, so all appear little inclined upward posteriorly. Black band from predorsal down through eye and across breast where meeting its fellow, above eye with narrow white bordering line in front and behind, below eye with broad white band each side separating black of muzzle and parallel black narrow band from first dorsal spine to hind eye edge, this then down across side of head along preopercle edge to gill opening; above eye narrow black line with narrow white front bordering line. Long cuneate black band along soft dorsal base, widening behind and reflected on upper surface of caudal peduncle; band bordered above and below with yellow line. Soft dorsal upper portions largely pale with median longitudinal dark line and another submarginal.

Anal largely brown, edge narrowly whitish and longitudinal black subbasal band, expanded little at last rays, bordered all around with yellow line. Caudal with black transverse band, hind edge broadly grayish, then submarginal yellow narrow band next to black band; basally fin brown, then buff band next to median black band. Paired fins uniform pale brown. Young examples lack black line touching hind eye edge, have muzzle pale, dark basal band of soft dorsal crossing caudal peduncle broadly though leaving white spot posteriorly above, anal with pale longitudinal subbasal line and 2 dark parallel bands, one median and other submarginal on fin.

Red Sea, Zanzibar, Madagascar, Mauritius, Seychelles, India, East Indies, Melanesia, Micronesia, Polynesia, Hawaii. A very abundant species in tropical coral reefs and with constant color pattern, the changes with age slight.

1319 and 1320. Alibijaban Island. March 6, 1909. Length 110 to 115 mm.

1270, 1271, 1282, 1283, 1284, 1285, 15692. Alimango Bay, Burias Island. March 5, 1909. Length 75 to 116 mm.

624. Bagacay Bay, Escarpada Island. March 13, 1909. Length 117 mm.

919. Balikias Island, Lubang. July 17, 1908. Length 95 mm.

1053, 4713, 4714, 9670. Bolalo Bay, Palawan. December 21, 1908. Length 77 to 114 mm.

754. Buang Bay, Talajit Island. March 15, 1909. Length 120 mm.

4856. Bubuan Island, Jolo. February 14, 1908. Length 30 mm.

817, 864. Busin Harbor, Burias Island. April 23, 1908. Length 65 to 94 mm.

1240 to 1242, 1244. Candaraman Island. January 4, 1909. Length 71 to 98 mm.

1029 and 1226. Capunuypugan Point. May 10, 1908. Length 95 to 110 mm.

11856. Caracaran, Batan Island. June 8, 1909. Length 89 mm.

507. Casogoran, Malhon Island. July 27, 1909. Length 66 mm.

658. Canmahala Bay. March 11, 1909. Length 110 mm.

254. Caxisigan near Balabac Island. December 29, 1909. Length 108 mm. [1010]. Blackish stripes on side more slaty and reds of dorsal and anal overshaded with dusky. Body stripes 7 or 8 carried into scaly portion of spinous dorsal. Yellow bar crosses front of cheek and ends about even with middle of eye; yellowish margin of ocular above eye a separate coloration. Yellow bar at anal base sulphur.

770. Cebu market. March 19, 1909. Length 112 mm.

349. Endeavor Strait. December 22, 1908. Length 78 mm.

155 to 158. Endeavor Strait. December 23, 1908. Length 105 to 116 mm.

1219, 1220, 4873. Galera Bay, Mindoro. June 9, 1908. Length 101 to 108 mm.

4610 and 4611. Grande Island reef, Subig Bay. January 8, 1908. Length 117 to 118 mm.

519. Gubat, Luzon. June 23, 1909. Length 78 mm.

1202. Hinunangan, Cabugan Island. July 30, 1909. Length 115 mm.

800. Langao Point, Luzon. June 24, 1909. Length 90 mm.

1087 to 1090. Limbones Cove, Luzon. January 4, 1908. Length 117 to 127 mm.

337 to 339. Limbones Cove. February 8, 1909. Length 71 to 115 mm.

524 and 7969. Little Santa Cruz Island. May 26, 1908. Length 110 mm.

1111, 1112, 4879 to 4881. Little Santa Cruz Island. May 28, 1908. Length 76 to 106 mm.

643. Lode Bay, Destacado Island. March 13, 1909. Length 107 mm.

1130. Mactan Cove. April 6, 1908. Length 103 mm.

3591. Mactan Island, Cebu. March 25, 1909. Length 110 mm.

435 to 438. Maculabo Island. June 14, 1909. Length 85 to 104 mm.
1298. Makesi Island. April 5, 1909. Length 76 mm.
1141. Mansalay Bay. June 4, 1908. Length 96 mm.
906 to 908. Maricaban Island. January 20, 1908. Length 95 to 110 mm.
1079 to 1081. Masbate reef, Masbate Island. April 20, 1908. Length 102 to 110 mm.
991. Nasugbu, Luzon. January 16, 1908. Length 95 mm.
390. Near Palag Bay, Luzon. June 16, 1909. Length 110 mm.
10404. North West of Verde Island. July 22, 1908. Length 87 mm.
22796. Opol, Mindanao Island. August 4, 1909. Length 71 mm.
364, 365, 702, 895, 896. Pagapas Bay. February 20, 1909. Length 50 to 106 mm.
273. Paluan Bay, Mindoro. December 11, 1908. Length 119 mm.
925 and 926. Panabutan Bay. February 6, 1908. Length 117 mm.
1119 and 1120. Pangasinan Island. February 13, 1908. Length 43 to 70 mm.
798. Parang, Mindanao. May 23, 1908. Length 112 mm.
One young. Philippines. Length 77 to 103 mm.
1308, 1309, 1310, 1314. Polloc. May 23, 1908. Length 77 to 103 mm.
603. Port Caltom. December 15, 1908. Length 109 mm.
1234. Port Dupon. March 17, 1909. Length 102 mm.
708 to 710. Port Galera. June 9, 1908. Length 105 to 115 mm.
4781, 4782, 8759, 10359. Port Jamelo, Luzon. July 13, 1908. Length 68 to 119 mm.
10334, 10335, 10348, 10479. Port Maricaban. July 21, 1908. Length 74 to 93 mm.
924 and 1022. Port Matalvi. November 22, 1908. Length 108 to 113 mm.
988. Port Matalvi. November 23, 1908. Length 105 mm.
22971. Port Palapag. June 3, 1909. Length 34 mm.
662. Port Uson. December 17, 1908. Length 116 mm.
4846. Rapurapu Island. June 22, 1909. Length 67 mm.
1032 and 1033. Romblon. March 26, 1908. Length 48 to 61 mm.
487, 697, 3884. Sablayan, Mindoro. December 12, 1908. Length 72 to 108 mm.
945 to 947. Sabtan Island. November 9, 1908. Length 103 to 115 mm.
1289. Sacol Island. September 9, 1909. Length 65 mm.
15708. Sanguisapo Island. February 24, 1908. Length 96 mm.
763, 994, 995. San Miguel Harbor, Ticao Island. April 21, 1908. Length 100 to 105 mm.
1178. Santa Cruz Island. April 24, 1908. Length 100 mm.
21887. Singaan Island. September 21, 1909. Length 46 mm.
1071 to 1073. South Luzon, Tumindao Island. February 26, 1908. Length 103 to 105 mm.
574 and 575. Surigao, Mindanao. May 8, 1908. Length 103 to 116 mm.
210, 211, 669. Taganak Island. January 7, 1909. Length 114 to 115 mm.
380 and 3881. Tara Island. December 14, 1908. Length 105 to 118 mm.
589, 590, 1150 [782], 1151 [783]. Tara Island. December 15, 1908. Length 30 to 102 mm. Head and front ocular bar entirely yellow and little dusty on top of snout variably distinct and forehead sometimes dusky. Dorsal nearly uniform yellow, except dusky margin of soft fin, sometimes tip of soft dorsal very slightly orange. Black blotch across front of caudal peduncle not quite reaching lower edge; on upper part of caudal peduncle bright yellow spot medianly with bluish prolongation from pedunclar blotch sometimes indicates black basal bar of dorsal and its yellow center distinct. Anal bars differentiated but more or less hazy, margin black. Caudal dusky hyaline, with narrow black basal bar.
1161 to 1163. Tataan, Simaluc Island. February 19, 1908. Length 67 to 92 mm.
882 and 883. Tataan. February 20, 1908. Length 73 to 77 mm.

238. Ulugan Bay, Palawan. December 29, 1908. Length 77 mm.
10434 and 10435. Varadero Bay, Mindoro. July 23, 1908. Length 81 to 92 mm.
21475. Doworra Island, Dutch East Indies. December 2, 1909. Length 104 mm.
432, 455, 4817, 9674, 9675. Talisse Island. November 9, 1909. Length 42 to 65 mm.
664. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 132 mm.
4815. Hokuho. January 9, 1910. Length 135 mm.
22959 to 22965. Reefs in Apra Bay, Guam. November 19–20, 1907. Length 38 to 115 mm.
21170 U.S.N.M. Hawaiian Islands. Paris Museum. Length 127 mm.
28553 U.S.N.M. Fiji. Paris Museum. Three young.
28559 U.S.N.M. Madagascar. Paris Museum. Length 73 to 95 mm. Two examples.
30653 and 30654 U.S.N.M. New Guinea. Australian Museum. Length 107 to 112 mm. Two examples.
32748 U.S.N.M. Indian Archipelago. Leiden Museum. Length 100 mm.
43936 U.S.N.M. Suva. *Albatross* collection. One young.
43936 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 90 to 114 mm. Six examples.
55427 U.S.N.M. Suva, Fiji. Bureau of Fisheries. Length 81 to 119 mm. Twelve examples.
55478 U.S.N.M. Honolulu. Fur Seal Commission. Length 119 mm.
57002 U.S.N.M. Apia, Samoa. Bureau of Fisheries 1902. Length 83 to 115 mm. Three examples.
65457 U.S.N.M. Mangareva. *Albatross* collection 1904–1905. Length 60 mm.
65796 U.S.N.M. Suva, Fiji. Bureau of Fisheries. Length 94 mm. [08864].
65952 U.S.N.M. Fakarava. *Albatross* collection.
71682 U.S.N.M. Nafa, Okinawa. *Albatross* collection 1906. Length 125 mm.
Philippines. Three examples (with 79260 U.S.N.M.). Length 111 to 122 mm.
Three examples. E. H. Taylor. As *Chaetodon setifer*.
83269 U.S.N.M. No locality. Wilkes Exploring Expedition. Length 87 mm.

CHAETODON MELAPTERUS Guichenot

Chaetodon melapterus GUICHENOT, Faun. Réunion, Maillard, 1862, p. 6. Reunion Island.

Chaetodon melanopterus PLAYFAIR, Fishes of Zanzibar, 1865, p. 34 (Aden).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 657 (Muscat, Arabia).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 63 (copied).

Snout conic, little longer than eye. Preopercle hardly serrated. Scales large. D. XIII, 21; A. III, 28; soft dorsal and anal rounded posteriorly. Brillant yellow with darker longitudinal stripes following series of scales, but without dark punctuation. Snout end black. Ocular band black, also another parallel from first dorsal spines to preopercle angle, narrower than orbit and extends around throat. Vertical fins black, except yellowish edges of dorsal and anal and hind white part of caudal. (Playfair.)

CHAETODON EPHIPPIUM Cuvier

Chaetodon ephippium CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 80, pl. 174. Moluccas.—LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, 1830 (1831), p. 174, pl. 29, fig. 1 (Beula Bay, Borabora).—GÜNTHER, Cat. Fish. Brit.

Mus., vol. 2, 1860, p. 7 (Amboina; Fiji).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 15 (Moluccas, Tahiti).—Günther, Journ. Mus. Godeffroy, vol. 2-3, Heft 5-6, 1874, p. 36, pl. 27, fig. A–B (Tonga, Society Islands).—De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884, p. 453 (Cardwell, Queensland).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 16 (North Celebes; Ternate; Mysore).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Currimao, Ilocos).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Weber, Siboga Exp., vol. 57, Fische 1913, p. 307 (Nusa Laut).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 65 (Ralum, New Pomerania, New Guinea, Bougainville Island, Jaluit, Samoa, Ceram, Tsingtau).— Fowler, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam), p. 34 (Samoa); Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston and Wake Islands).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 56 (Santo Domingo de Basco, southern Batangas, Tubigan Island).

Rabdophorus ephippium Swainson, Nat. Hist. Animals, vol. 2, 1839, p. 211.

Tetragonoptrus (*Rabdophorus*) *ephippium* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 36, pl. (16) 378, fig. 2 (Cocos, Java, Celebes, Flores, Timor, Ternate, Amboina, Ceram, Harucu, Goram, New Guinea).

Chaetodon principalis Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 81. East Indies (on Renard and Valentyn).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 156.

Chaetodon garnoti Lesson, Voy. Coquille, Zool., pt. 2, vol. 1, 1830 (1831), p. 174 (name in synonymy).

Chaetodon mulsanti Thiollière, Fauna Woodlark, 1857, p. 163. Woodlark Island.

Chaetodon papek (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 163 (name in synonymy).

Depth 1⅔ to 1¾; head 3 to 3⅕, width 2 to 2⅓. Snout 2½ to 3 in head from snout tip; eye 4 to 4⅖, 1⅔ to 1⅘ in snout, 1¼ to 1⅖ in interorbital; maxillary ½ to ⅗ in snout, 3½ to 3¾ in head; interorbital 3⅛ to 3⅔, convex. Gill rakers 3+10, short points, robust, ⅙ of gill filaments, which 1⅕ in eye.

Scales 34 to 37 between gill opening and caudal base; tubes 32 to 34 in lateral line; 9 to 11 scales above lateral line, 16 or 17 below. Scales with 8 to 10 basal radiating striae, with 1 to 7 incomplete auxiliaries; 101 to 143 apical denticles, with 15 to 27 transverse series of basal elements; circuli fine.

D. XII or XIII, 22, I or 23, I, last spine 1⅔ to 2 in total head length, fourth ray 1⅔ to 2 in combined head and body; A. III, 21, I or 22, I, last spine 1⅘ to 2 in head, tenth ray 1⅗ to 2; least depth of caudal peduncle 2⅔ to 3; caudal 1½ to 1¾, hind edge slightly double concave; pectoral 1⅕ to 1½; ventral 1⅓ to 1⅖.

Largely light brown, each row of scales on lower side of abdomen with slightly dark longitudinal streak formed along junctures of scales. Preorbital, postocular and opercle grayish. Diffuse pale brownish streak from above down through eye and fading on cheek below. Obscure brownish line from fourth dorsal spine nearly to pectoral origin; posterior half of back up over squamation of spinous dorsal posteriorly and all of greater basal portion of soft dorsal black. On back area broadly bordered whitish; also border forms on outer portion of soft dorsal, which pale, edge of which with blackish line and also another submarginal. Soft anal broadly bordered white, though with brown submarginal line only in smaller examples. Caudal with pale border all around, median rays with brownish. Paired fins pale brown.

Cocos Islands, East Indies, Melanesia, Polynesia. Known among all chaetodonts by the striking and contrasted black of the back posteriorly. It presents little variation.

8947. Between Paron and Jesus Points, Albay Gulf, Luzon. June 21, 1909. Length 176 mm.

8349. Buang Bay, Talajit Island. March 15, 1909. Length 220 mm.

A585. Busbus Point, Siasi Island. September 20, 1909. Length 196 mm.

9658. Cagayan, Sulu Island. January 8, 1909. Length 150 mm.

1247. Candaraman Island. January 4, 1909. Length 132 mm.

1024. Capunuypugan Point. May 10, 1908. Length 143 mm.

12483. Endeavor Strait. December 23, 1908. Length 172 mm.

225. Endeavor Strait. December 24, 1909. Length 150 mm.

9019. Langao Point, Luzon. June 24, 1909. Length 167 mm.

6026 and 6027. Little Santa Cruz Island. May 28, 1908. Length 200 to 205 mm.

4739. Maricaban Island, Luzon. January 20, 1908. Length 200 mm.

6237, 6238, 6274. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 195 to 220 mm.

8059. Mompog Island. March 3, 1909. Length 216 to 222 mm. Two examples.

8880 and 8881. Near Palag Bay, Luzon. June 16, 1909. Length 186 to 159 mm.

7328 and 7329. Pandan Island near Sablayan Bay, Mindoro. December 12, 1908. Length 183 to 195 mm. Back anteriorly greenish yellow, horizontal stripes below pale purple, not continued to anal base. Pale purple in bar above pectoral base and blotch under eye. Very short black ocular bar above eye. Orange bar at pectoral base. Snout, lower head and breast cadmium orange to sulphur below. Tips of dorsal spines pale lemon, color continued on rays and on produced rays; edge of vertical portion of soft dorsal black resting on inframarginal bar of hyaline white near third diameter of pupil; below this very narrow black line and broad dusky scarlet orange bar which extends triangularly into produced portion and well along lower half of produced rays. Anal whitish on basal portion, spines and edge of soft fin bright yellow with narrow submarginal orange bar. Caudal base scarlet, color extending forward on lower portion of caudal peduncle and as orange along caudal edges, tip or edge of fin orange and rays with narrow black line each side. Pectoral dusky hyaline. Ventral lemon yellow.

10387 and 10389. Port Jamelo, Luzon. July 13, 1908. Length 157 mm.

7036 and 7047. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 192 to 222 mm.

8781. Quinalasag Island. June 12, 1909. Length 171 mm.

651. Rapurapu. June 22, 1909. Length 140 mm.

6908 and 6909. Santo Domingo, Batan. November 7, 1908. Length 202 to 217 mm.

7853. Taganak Island. January 7, 1909. Length 195 mm.

877 to 879 [189, 190]. Tataan, Simaluc Island. February 20, 1908. Length 133 to 140 mm. Yellowish olive green above and anteriorly, shading lavender on head. Ocular bar almost obsolete, showing as very narrow dusky stripe above eye and short blotch on lower orbit. On lower side about 6 pale lilac stripes half pupil width, narrower than interspaces. Before eye, except small lavender area, snout and lower head bright cadmium orange, continued across belly as median sulphur yellow indistinct stripe. Purplish bar down shoulder under opercular flap, continued as cadmium orange across pectoral base and in axil. Large jet black blotch occupies most of dorsal posteriorly, reaching slightly below level of caudal peduncle and forward to seventh spine; defining blotch below curved white band width of eye. Tips of dorsal spines bright sulphur yellow, below membranes pale; produced dorsal ray and bar downward on vertical edge orange, set off from black by yellow; vertical edge with hyaline band becoming white below, defined by black on each side. Anal broadly olive basally, extreme tip dark and lemon yellow band wide as pupil submarginal, below gray, black, orange, red, black, gray and yellow, colors most definite about center of soft part and continued down vertical edge, all but orange lost on spinous portion. Caudal hyaline white, tip crescentic orange bar, edges cadmium and rays with fine black lines. Pectoral hyaline, rays with narrow black lines. Ventral bright sulphur yellow.

498 and 4966. Tataan, Tawi Tawi. February 21, 1908. Length 148 to 180 mm.

450. Doc Can Island. January 7, 1910. Length 129 mm.

19789. Gomomo Island. December 3, 1909. Length 97 mm.

6947 and 6949. West coast of Sabtan Island. November 8, 1908. Length 200 to 212 mm.

4722 and 12906. Tobea Island. December 14, 1909. Length 92 to 101 mm.

414. Togian Bay, Togian Island. November 19, 1909. Length 108 mm.

12789. Limbe Strait, Celebes. November 10, 1909. Length 92 mm.

A1044 and A1053. Tidore Island, south of Ternate. Novemer 24, 1909. Length 199 to 205 mm.

4688, 4689, 4692. Apra Bay, Guam. November 19–20, 1907. Length 71 to 135 mm.

30589 U.S.N.M. New Guinea. Australian Museum. Length 155 to 175 mm. Two examples.

52503 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 70 to 170 mm. Nine examples.

62358 U.S.N.M. Honolulu. Dr. D. S. Jordan, 1908.

83289 U.S.N.M. No locality, probably Hawaiian? Wilkes Exploring Expedition. Length 25 mm.

CHAETODON BENNETTI Cuvier

Chaetodon bennetti Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 84. Sumatra.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 12 (Amboina).—Playfair, Fishes of Zanzibar, 1865, p. 33 (Zanzibar).—Günther, Cruise Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 73 (German New Guinea; Mikindani, East Africa; Apaman Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 65, pl.8, fig. 2 (southern Batangas Province).

Chaetodon bennettii Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 37, pl. 29, fig. 4a (Paumotus, Society Islands, Gilbert Islands, Kingsmills).

Coradion bennetti Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 147 (Sumatra).

Tetragonoptrus (*Rabdophorus*) *bennetti* Bleeker, Atlas, Ichth. Ind. Néerland., vol. 9, 1877, p. 34, pl. (14) 376, fig. 2 (Sumatra, Java, Halmahera, Amboina).

Chaetodon vinctus Lay and Bennett, Zool. Beechey's Voyage, Ichth., 1839, p. 62, pl. 17, fig. 1. Byam Martin Island, Paumotus.

Depth 1½ to 1⅗; head 3¼ to 3⅓, width 1¾ to 1⅘. Snout 3 to 3¼ in head from snout tip; eye 3 to 3⅗, slightly longer to 1⅕ in snout, 1 to 1⅖ in interorbital; maxillary ¾ to ⅘ in snout, 3½ to 3⅔ in head; interorbital 2⅞ to 3, convex. Gill rakers 5+14, short points, 6½ in gill filaments which nearly equal eye.

Scales 38 to 41 between gill opening and caudal base; tubes 28 to 36 in lateral line; 9 scales above lateral line, 20 below. Scales with 8 to 11 basal radiating striae, largely marginal with age; apical denticles 53 to 119, basal elements in 6 to 12 transverse series; circuli fine.

D. XIV, 17, I or 18, I, last spine 1⅗ to 2 in total head length, eighth ray 1¼ to 1⅘; A. III, 16, I, third spine 1⅖ to 1⅔, seventh ray 1⅓ to 1¾; least depth of caudal peduncle 2⅞ to 3; caudal 1⅓ to 1½, hind edge broadly convex; pectoral 1 to 1⅕; ventral 1 to 1⅕.

Pale brownish, back and bases of dorsals usually darker, also often anal base. Broad deep brown band above from occiput, but not meeting its fellow, down through eye over cheek and lower surface of head; front and hind edges each with white line, both of which usually extend down slightly on side of chest. From suprascapula white line extends down along hind edge of opercle sloping back before and below pectoral base to spinous anal origin; another more or less parallel obliquely back from suprascapula to bases of front anal rays. Near end of lateral line, over spinous anal, large black rounded spot, 7 to 9 scales in horizontal diameter, and with white border. Young with dark brown band, 3 scales wide, across front of caudal peduncle.

Widely distributed in the Indo-Pacific, from Zanzibar to the East Indies, Melanesia and Polynesia. It is not subject to much variation in color pattern, our series of specimens quite uniform. Also the changes with age are slight.

9089. Casogoran, Malhon Island. July 27, 1909. Length 156 mm. Yellow, somewhat tinged orange, scale centers brightest on either side due to slight duskiness giving appearance of clear stripe through each scale row. Throat and breast bright lemon. Ocular bars scarcely touch nape, centers brown, edges bluish white. Pectoral stripes and edge of lateral ocellus bluish white, ocellus center blackish. Brownish bar begins obscurely at bases of soft dorsal rays, crosses base of caudal peduncle and fades into anal. Similar bar across caudal, just within hyaline tip. Edges of both soft dorsal and anal somewhat orange, divided by dusky line into 2 parts.

8447. Mactan Island, Cebu. March 25, 1909. Length 162 mm.

9199, 9200. Mahinog, Camaguin. August 3, 1909. Length 157 to 168 mm.

6905. Santo Domingo, Batan. November 7, 1908. Length 155 mm. Cadmium yellow, sides overshaded with dusky, leaving more or less obscure central stripe through rows of scales below. Large black lateral ocellus with slaty blue rim. Bright slaty blue line from shoulder till above base of third anal spine; another from slightly above and anterior to origin of first, passing across hind opercle edge in front of pectoral base almost reaching vent. Orbital bars not quite meeting above, fading out on opercle and limited each side by slaty blue lines. Terminal third of caudal and ⅗ of pectoral hyaline. Submarginal dusky bar on soft dorsal, anal and caudal and more pronounced dusky bar across caudal peduncle passing into dorsal and anal through their axils: Snout somewhat dusky above.

A626, A629. Simaluc Island. September 22, 1909. Length 164 and 165 mm.

22968 [160]. Tataan Bay. February 19, 1908. Length 85 mm. Dusky sulphur yellow, paler on breast and belly, cadmium shades above. Blackish lavender gray lateral ocellus above body axis somewhat posteriorly twice eye diameter. Ocular band umber, begins before dorsal, passes through eye about pupil width, passes below to subopercle edge and diffusely on breast; limited each side by lavender gray border slightly less than half width of dark band. In humeral region 2 lavender lines about half pupil width passing obliquely downward; posterior with only slight forward curve ends near middle of soft anal base; front one passes down before hind opercle edge and pectoral base and bends back to end near front of anal base. Indistinct umber bar crosses front of caudal peduncle, merging into cadmium orange bar at vertical base of dorsal and an indistinct bar similarly located on anal bordered indefinitely on peduncle region by gray. Short black stripe between eyes across snout. Upper lip cadmium. Opercular edge cadmium beyond gray. Dorsal body color, tips of spines and submarginal bar of soft fin cadmium, soft edge very narrowly dusky. Terminal half of caudal dusky hyaline, under this short cadmium bar. Anal like body with cadmium margin like dorsal. Pectoral dusky hyaline, cadmium at base. Ventral sulphur basally, tips cadmium.

892. West coast of Palaui Island. November 18, 1908. Length 140 mm.

A1374. Basa Island on reef, Celebes. December 17, 1909. Length 167 mm.

A945 and A946. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 150 to 160 mm.

A1043. North of Malibagu Point, Celebes. November 21, 1909. Length 155 mm.

561. Binang Unang Island, Una Una Road, Celebes. November 18, 1909. Length 130 mm.

A710. Danawan Island. September 27, 1909. Length 147 mm.

A753. Sipadan Island. September 28, 1909. Length 150 mm.

CHAETODON SPECULUM Cuvier

Chaetodon speculum (Kuhl and Van Hasselt) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 73. Batavia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 12 (copied).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 304 (Buton Straits and Tual).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 75 (Matupi and New Pomerania).—Herre and Montalban, Philippine Journ. Sci., vol 34, No. 1 September 1927, p. 66, pl. 14, fig. 2 (southern Batangas, Calapan, Masbate, Gigantangan, Quiminatin).

Citharoedus speculum Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 145 (Java).

Tetragonoptrus (*Rabdophorus*) *speculum* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 34, pl. (13) 375, fig. 3 (Java, Bawean, Amboina, Ceram, Banda).

Chaetodon spilopleura (Reinwardt) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 74. Moluccas.

Chaetodon zanzibarensis Playfair, Fishes of Zanzibar, 1865, p. 33, pl. 6, fig. 1. Zanzibar.—Pfeffer, Jahrb. Hamburg. Wiss. Anstalt., vol. 6, 1889, p. 22 (Zanzibar).

Chaetodon unifasciatus (not Gronow) (Van Hasselt) Bleeker, Verh. kon. Akad. Wet. Amsterdam (Rev. Chaetodon.), vol. 17, 1877, p. 63 (name in synonymy).

Depth 1½ to 1⅗; head 3 to 3⅕, width 1⅘ to 2. Snout 3⅕ to 3⅗ in head; eye 2⅔ to 3⅖, greater than snout in young to 1⅛ with age, little greater than interorbital in young to 1¼ in interorbital with age; maxillary ⅗ to ⅘ in snout, 3¼ to 4 in head; interorbital 2⅔ to 2¾, broadly convex. Gill rakers 5 + 10, short points, ⅛ of gill filaments, which equal eye.

Scales 42 to 44 between gill-opening and caudal base; tubes 35 to 17 in lateral line; 12 scales above lateral line, 19 or 20 below. Scales with 1 to 9 basal radiating striae, largely absent with age; apical denticles 56 to 135, with 7 to 9 series of transverse basal elements.

D. XIV, 17, i or 18, i, last spine 1¼ to 1⅗ in head, seventh ray 1⅕ to 1⅖; A. III, 16, i, third spine 1⅖ to 1⅞, seventh ray 1½ to 3⅔; least depth of caudal peduncle 2½ to 3; caudal 1⅖ to 1⅗, hind edge slightly convex; pectoral 1⅒ to 1¼; ventral 1⅛ to 1¼.

Light brown generally. Black band from supraoccipital region to eye, which it crosses, down over cheek and front of chest where also meeting its fellow diffusely. Large blackish blotch on side of back equal to anal fin length in extent, long as head in young. Caudal with broad pale posterior edge, in young hind half of fin pale.

Zanzibar, Seychelles, East Indies. Coloration constant and with little variation even due to age. One example (1182) differs in that a narrow brown line extends from snout tip to dorsal and along chin medianly.

8673. Biri Channel. June 2, 1909. Length 122 mm.
1182, 1539. Bolalo Bay. March 10, 1909. Length 145 mm.
1099. Bugsuk Island. January 5, 1909. Length 86 mm.
778 to 780. Jolo. March 6, 1908. Length 75 to 94 mm.
A405. Jolo Market. March 7, 1908. Length 141 mm.
140 and 431. Langao Point, Luzon. June 24, 1909. Length 95 to 126 mm.
1116, 6028 to 6029, 6031. Little Santa Cruz Island. May 28, 1908. Length 136 to 160 mm.
369. Malapascua Island. March 16, 1909. Length 111 mm.
400 and 401. Matnog Bay. May 31, 1909. Length 124 to 143 mm.
6279. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 140 mm.
605 and 1092. Murcielagos Bay. August 9, 1909. Length 110 to 115 mm.
4725, 4744. Pilas Island. September 12, 1909. Length 67 to 97 mm.
629. Port Banalacan, Marinduque. February 23, 1909. Length 120 mm.
46. Port Langcan, Palawan Island. April 8, 1909. Length 123 mm.
10480, 10494. Port Maricaban. July 21, 1908. Length 128 to 130 mm.

6999. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 157 mm.

6906. Santo Domingo, Batan. November 7, 1908. Length 150 mm.

209, 794. Taganak Island. January 7, 1909. Length 117 to 127 mm

1166, 161. Tataan Bay, Simaluc Island. February 19, 1908. Length 82 mm. Sulphur yellow, dusky above, pale on breast. An elliptical black blotch long as head above axial region, slightly posterior to middle of body. Ocular band begins before front of dorsal, ends on breast, widest just below eye and somewhat less than eye in width. Iris golden outside ocular band. Dorsal, anal and caudal like body, edges narrowly hyaline submarginally nearly cadmium; terminal half of caudal dusky hyaline. Pectoral dusky hyaline, yellow basally. Ventral bright sulphur yellow.

A564. Teomabal Island. September 18, 1909. Length 150 mm.

1050, 1051. Tulnalutan Island. September 9, 1909. Length 133 to 141 mm.

962. West coast of Palaui Island. November 18, 1908. Length 144 mm.

A1155. Gane Road, Gillolo Island. December 1, 1909. Length 155 mm.

666. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 150 mm.

656. Nan Wan, Formosa. January 25, 1910. Length 142 mm.

A1593. Soo Wan, Formosa. January 29, 1910. Length 145 mm.

CHAETODON MACULICEPS (Ogilby)

Megaprotodon maculiceps Ogilby, Proc. Roy. Soc. Queensland, vol. 23, 1910, p. 14. Moreton Bay.

Chaetodon plebeius (not Cuvier) Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 28, pl. 6, fig. 1 (Tablas).

Depth $1\frac{2}{3}$ to $1\frac{4}{5}$; head $3\frac{1}{8}$ to $3\frac{2}{5}$, width $1\frac{4}{5}$ to $1\frac{7}{8}$. Snout $2\frac{7}{8}$ to 3 in head; eye 3 to $3\frac{1}{3}$, 1 to $1\frac{1}{8}$ in snout, 1 to $1\frac{1}{5}$ in interorbital; maxillary $\frac{3}{5}$ to $\frac{3}{4}$ in snout, $3\frac{4}{5}$ to 4 in head; interorbital $3\frac{4}{5}$ to 4, broadly convex. Gill rakers 7 + 14, short points, $\frac{1}{8}$ of gill filaments, which $1\frac{1}{2}$ in eye.

Scales 40 to 42 between gill opening and caudal base; tubes 30 to 32 in lateral line; 8 or 9 scales above lateral line, 16 to 19 below. Scales with 6 to 9 basal radiating striae; apical denticles 70 to 96, with 7 to 8 transverse series of basal elements.

D. XIV, 16, i or 17, i, last spine $1\frac{3}{5}$ to 2 in head, fifth ray $1\frac{2}{5}$ to $1\frac{4}{5}$; A. IV, 14, i or 15, i, second spine $1\frac{3}{5}$ to $1\frac{4}{5}$, third ray $1\frac{2}{3}$ to $1\frac{4}{5}$; least depth of caudal peduncle $2\frac{2}{3}$ to 3; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, hind edge broadly convex; pectoral $1\frac{1}{8}$ to $1\frac{1}{5}$; ventral $1\frac{1}{8}$ to $1\frac{1}{5}$.

Back brown, below pale brown to whitish. Each row of body scales with median dark brown line or stripe, broader and darker above lateral line. Large blackish longitudinal blotch along greater part of lateral line and side of back. Black band from middle of predorsal, not meeting its fellow, down through eye though only little wider than pupil and reaching gill opening below, but not on chest; margined with white line in front and behind. Black ocellated blotch at upper part of caudal peduncle largely, little larger than eye. Fins all dull brown, caudal broadly pale or grayish behind.

Previously apparently known only from Ogilby's description, based on an example but 75 mm. long in the Queensland Museum. This species appears to be distinct from *Chaetodon plebeius* in the presence of the dark blotch on the caudal peduncle.

958. Langao Point. June 24, 1909. Length 98 mm.
3612. Maculabo Island. June 13, 1909. Length 86 mm.
387. Near Palag Bay, Luzon. June 16, 1909. Length 110 mm.
489, 1152 [1640]. Porongpong Island. June 11, 1909. Length 114 to 130 mm. Pale silvery yellow, dusky stripe through each row of scales. Brown or black ocular band wide as pupil, margined each side by blue white line. Tip of snout and chin dusky orange. Postocular region with brown spots, continuation of dusky body stripes. On upper side, between fourth and tenth dusky stripes large black or very dark blue blotch extending very slightly behind shoulder to near base of anterior soft dorsal rays; through this blotch dusky stripes become bright blue and continue as such till above gill opening; next stripe immediately under blotch similar. Black spot on upper half of caudal peduncle crosses top in axil of dorsal, bordered below by bluish white line. Fins body color, edge of soft dorsal hyaline and brown; both dorsal and anal more or less dusky terminally; dorsal spines dusky yellow, membranes clearer and brighter. Terminal third of caudal dusky hyaline, adjoining yellow much dusted. Pectoral dusky hyaline, yellowish at base. Ventral uniform yellow.
884. Port Galera, Mindoro. June 9, 1908. Length 120 mm. [658].
2875. Nan Wan, Formosa. Length 142 mm.

CHAETODON PLEBEIUS Cuvier

Chaetodon plebeius (Broussonet) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 68. South Sea.

Chaetodon plebejus Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 5 (no locality); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 35, pl. 32, fig. B (South Sea).—Day, Fishes of India, pt. 1, 1875, p. 104, pl. 26, fig. 3 (British Museum example).—Macleay, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 390 (Sue Island, Torres Strait, Queensland).—Day, Fauna Brit. India, vol. 2, 1889, p. 3.—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 54 (Viti Island; New Guinea).

D. XIV, 17 to 19; A. IV or V, 15 to 17. Scales 43 to 45. Yellow. Dark ocular band and large ellipsoid blackish blotch below last dorsal spines and front of soft dorsal. No dark blotch on caudal peduncle. Length 100 mm.

East Indies, Formosa, Queensland and Polynesia.

CHAETODON DECORATUS Ahl

Chaetodon decoratus Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 71, pl. 1, fig. 6. Yokohama, Japan.

Apparently closely related to *Chaetodon semeion* but with a black band across caudal peduncle. Though the following formula is given it is not sufficiently distinct from the variations of our materials of *Chaetodon semeion*.

Scales 35 laterally, 6 above, 13 below. D. XIV, 22; A. III, 20.

CHAETODON SEMEION Bleeker

Chaetodon semeion Bleeker, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. 450. Cocos Keeling Islands, Indian Ocean.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 7 (copied); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 37, pl. 28 (Society Islands and Samoa).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1899, p. 492 (Thornton Island).—Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 343 (Apia).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 69 (Samoa, New Pomerania, New Guinea).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Wake Island).

Tetragonoptrus (*Rabdophorus*) *semeion* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 37, pl. (12) 374, fig. 5 (Cocos, Celebes, Goram).

Depth 1⅗ to 1¾; head 3 to 3¼, width 2 to 2⅕. Snout 2⅖ to 3 in head; eye 3⅞ to 4½, 1⅖ to 1⅔ in snout, 1⅙ to 1½ in interorbital; maxillary ½ to ⅗ in snout, 3½ to 4 in head; interorbital 3⅖ to 3½, convex. Gill rakers 3 + 14, short points, ⅛ of gill filaments, which equal eye.

Scales 30 or 31 between gill opening and caudal base; tubes 28 to 32 in lateral line; 8 or 9 scales above lateral line, 13 or 14 below. Scales with 11 or 12 basal radiating striae; apical denticles 145 to 160, with 23 to 35 series of basal segments transversely; circuli fine.

D. XIII or XIV, 24, I or 25, I, last spine 2⅕ to 2¼ in head, second elongated ray 1⅞ to 2⅛ in combined head and body; A. III, 21, I or 22, I, third spine 2 to 2⅗ in head, tenth ray 1⅚ to 2; least depth of caudal peduncle 3 to 3⅖; caudal 1 to 1⅕, deeply emarginate with upper and lower ends slender points; pectoral 1⅓ to 1⅖; ventral 1⅖ to 1½.

Brown, little paler on abdomen. Broad black band from predorsal to eye and down across cheek where wider, though not extended on chest or breast. Each scale on body beginning behind vertical of pectoral base with small dusky apical dot, also not on caudal peduncle or anal base; as rows of scales below lateral line slightly inclined, likewise series of dots. Soft dorsal and anal edges narrowly white, each with dusky submarginal line. Black median band diffuse and narrow at first begins on spinous dorsal posteriorly, then extends gradually expanding to last dorsal rays. Black blotch on last anal rays subbasally and narrowed forward. Caudal and paired fins uniformly pale brown.

Keeling Islands, East Indies, Polynesia.

514 [1555]. Biri Channel, Balicuatro Island. June 2, 1909. Length 140 mm. General color cadmium yellow. Forehead and snout posteriorly dusky. Ocular bar equal to eye above, somewhat broader below, extends across interopercle but not on chest. Black central band from last dorsal spine to vertical edge of fin, somewhat yam-shaped, rounded on vertical portion. On sides behind shoulder each scale with small black dot in central margin, these extending on soft dorsal base to black band; space above anal base and caudal peduncle immaculate, also breast and belly from level of pectoral to front of anal without spots. Dorsal spines and membranes at tips, including all

of first spines, sulphur yellow; central cadmium streak extending from base of produced ray and coloring all outer portion, behind narrow sulphur band, terminally narrower white, black and hyaline border. Anal marked as dorsal, black band beginning about fourth or fifth soft ray and very narrow half its distance, when expanded to rounded head; spines sulphur yellow and white; black and hyaline border as in dorsal. Caudal nearly entirely hyaline, rays slightly dusky, somewhat orange basally, central strip and on fin edges. Paired fins cadmium.

1077 [1643]. Butauanan Island. June 12, 1909. Length 150 mm.
508. Langao Point. June 24, 1909. Length 155 mm.
9198. Mahinog, Camiguin Island. August 3, 1909. Length 235 mm.
9090. Malhon Island. July 27, 1909. Length 205 mm.
6250. Medio Island, Galera Bay, Mindoro. June 9, 1909. Length 200 mm.
A627, A628. Simaluc Island. September 22, 1909. Length 192 to 204 mm.
19552. Singaan Island. September 21, 1909. Length 106 mm.
A457. Tulnalutan Island. September 9, 1909. Length 21 mm.
10441. Varadero Bay, Mindoro Island. July 23, 1908. Length 145 mm.
560. Binang Unang Island. November 18, 1909. Length 155 mm.
A709. Danawan Island. September 27, 1909. Length 167 mm.
A1432. Kapoposang at Ford. December 28, 1909. Length 188 mm.
A698. Si Amil Island. September 26, 1909. Length 203 mm.
A754. Sipadan Island. September 28, 1909. Length 198 mm.
A1036. Buka Buka Island, Celebes. November 20, 1909. Length 202 mm.
A958, A959. Sadaa Island, Celebes. November 17, 1909. Length 172 to 176 mm.
A1064, A1065. Tidore Island, south of Ternate. November 24, 1909. Length 202 to 208 mm.
52449 U.S.N.M. Apia, Samoa. Bureau of Fisheries, 1902. Length 160 mm.

CHAETODON BLACKBURNII Desjardins

Chaetodon blackburnii DESJARDINS, Sept. Ann. Rapp. Soc. Hist. Nat. Maurice, 1836, p. 58. Mauritius.

Chaetodon blackburni VALENCIENNES, Règne Animal, Poiss., Ill., 1839, pl. 39, fig. 3 (note).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 32 (Mauritius).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 53 (Mauritius).

Snout slightly produced, longer than eye. Preopercle indistinctly denticulated. Scales 43, above 7, below 18. D. XVI, 22, front spines rather low and third equals snout; A. III, 16; soft dorsal and anal with obtuse angle. Front part of body light colored, with brownish black ocular band, narrower than eye. Soft dorsal and anal and tail between brownish black, color deeper posteriorly. Six narrow dark stripes descend obliquely forward towards head and belly. Caudal and paired fins colorless in spirits. (Günther.)

Ahl gives its dimensions as 100 mm. The imperfectly described *Chaetodon luctulosus*[4] may be the present species.

Snout short. D. XIV, 17; A. III, 16. Body with longitudinal streaks. Length 126 to 152 mm.

---

[4] QUOY and GAIMARD, Voy. Uranie, Zool., January 29–May 26, 1825, p. 382. No locality.—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 37 (no locality).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 33 (copied).

We have been unable to locate the original publication of the description of the present species. The above reference is simply quoted from Valenciennes, as evidently the case with Günther and Ahl.

CHAETODON LEUCOPLEURA Playfair

Chaetodon leucopleura PLAYFAIR, Fishes of Zanzibar, 1866, p. 35, pl. 6, fig. 3. Zanzibar.

Depth 1½; head 3⅕. Snout 3 in head from snout tip; eye 3½, 1⅕ in snout; maxillary 4 in head. Preopercle entire. Scales 27 in lateral line, 5 above, 13 below. D. XII, 23 or 24; A. III, 26; soft dorsal and anal obtusely angular behind; caudal slightly emarginate. Dark ocular band little narrower than orbit, extends from dorsal origin down to chest. Muzzle blackish, with several yellowish lines across interorbital and 2 yellow circular marks on neck. Hind opercle edge yellow. Back and belly brown, shaded to white or yellowish at middle of sides. On belly 5 or 6 longitudinal yellow stripes, highest back from pectoral axil. Vertical fins yellow, with gray submarginal line on soft fin. Caudal yellow, with broad gray edge. Pectoral white. Ventral yellow. Length 191 mm. (Playfair.)

CHAETODON LEUCOPYGUS Ahl

Chaetodon leucopygus AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 72, pl. 2 fig. 12. Daressalem.

Snout 1¼ to 1⅓ in eye, which 3 in head. Scales 31, in lateral line, 5 above, 13 below. D. XII, 22 or 23; A. III, 18; soft dorsal and anal each forming right angle; caudal truncate. Whitish. Broad dark ocular bar. Dull band extends from above caudal peduncle down toward anal front basally. Narrow dark lines within scale rows along body below. Vertical fins yellowish white, edges white and with submarginal dark line; dorsal from seventeenth ray dark brown. Caudal posteriorly with milk-white crescentic edge, before it clear brown and still anterior milk-white band. Paired fins whitish. Length 109 mm. (Ahl.)

CHAETODON HOWENSIS Waite

Chaetodon howensis WAITE, Rec. Australian Mus., vol. 5, 1903, p. 33, fig. 2. Lord Howe Island.

D. XII, 25; A. III, 18. Scales 48. White, with 5 broad black bands, all wider than interspaces, first ocular, second from front of spinous dorsal, third widest and from middle of spinous dorsal, fourth at front of soft dorsal to anal and fifth at caudal base. Fin spines yellow. Length 157 mm. (Waite.)

CHAETODON DAEDALMA Jordan and Fowler

Chaetodon daedalma Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 538, fig. 4. Nafa, Okinawa.

Readily known by its entirely reticulate pattern, the edge of each scale deep brown to dusky and the center yellowish.

51390 U.S.N.M. Nafa, Okinawa, Rui Kiu. Prof. J. O. Snyder. Length 143 mm.

CHAETODON NIPPON Steindachner and Döderlein

Chaetodon nippon (Döderlein) Steindachner and Döderlein, Denkschr. Akad. Wiss. Wien, Math.-Naturwiss. Kl., vol. 48, abth. 1, 1884, p. 23, pl. 4, fig. 2. Tokio.—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 537 (Totomi Bay, Misaki, Tokio market).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 78 (type).

Chaetodon carens Seale, Philippine Journ. Sci., vol. 5, No. 2, July, 1910, p. 115, pl. 1, fig. 1. Bantayan Island, Philippines.—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 55, pl. 15, fig. 2 (type).

Chaetodon ocellifer Franz, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 49, pl. 5, fig. 35. Nagasaki.

Osteochromis larvatus Franz, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 52, pl. 5, fig. 43.

Chaetodon decipiens Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 79 (on *Chaetodon nippon* Jordan and Fowler, not Steindachner and Döderlein).

D. XIII, 19 to 21; A. III, 16 or 17; scales 35 or 40. Body nearly uniform brown.

We have united the nominal *Chaetodon carens* with this species as it shows no structural differences. The broad dark band from the middle of the spinous dorsal extending down and occupying most of the anal is apparently a variable character.

50802 U.S.N.M. Totomi Bay. Three examples. Length 87 to 127 mm.
72111 U.S.N.M. Misaki, Sagami. Three examples. Length 119 to 138 mm.

CHAETODON XANTHOCEPHALUS Bennett

Chaetodon xanthocephalus Bennett, Proc. Comm. Zool. Soc. London, vol. 2, 1832, p. 182. Ceylon.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 33 (type).—Playfair, Fishes of Zanzibar, 1865, p. 36 (Zanzibar).—Day, Fishes of India, pt. 1, 1875, p. 104, pl. 26, fig. 4 (type); Fauna Brit. India, vol. 2, 1889, p. 3.—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 68 (Mikindani, East Africa).—Barnard, Ann. South. Afric. Mus., vol. 21, pt. 2, October, 1927, p. 613 (Mozambique).

Depth 1¾; head 4⅓; eye 4 in head, 1½ in snout, 1½ in interorbital. Preopercle indistinctly serrated. Scales 44 to 46 in lateral line, 11 above, 18 below. D. XIII or XIV, 25 to 27; A. III, 24; soft dorsal and anal rounded. No ocular band, small dark blotch above orbit. Brownish, with 6 indistinct dark vertical streaks. Dorsal and anal dark violet, edges white. Caudal and ventral yellowish. (Day.)

East Africa, Zanzibar, India, Ceylon. We have examined a single example.

43938 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 203 mm.

CHAETODON NIGRIPINNATUS Desjardins

Chaetodon nigripinnatus DESJARDINS, Dix. Rapp. Soc. Hist. Nat. Maurice, 1836, p. 57. Mauritius.

Chaetodon nigripinnis PETERS, Arch. Naturg., vol. 21, 1855, p. 246. Mozambique.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 32 (copied).

Choetodon (Tetragonoptrus) nigripinnis SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 260, pl. 29, fig. 4 (type).

Chaetodon xanthocephalus (not BENNETT) AHL, Arch. Naturg., vol. 89, abth. 8, Heft 5, 1923, p. 68 (type of *Chaetodon nigripinnis*).

This nominal form according to Sauvage is not clearly distinct from *Chaetodon xanthocephalus* Bennett with its developed fins, blackish marginally, bordered red at base and 5 transverse brown lines on body.

CHAETODON FREMBLII Bennett

Chaetodon fremblii BENNETT, Zool. Journ., vol. 4, 1828, p. 42. Hawaiian Islands.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 16 (type); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 39, pl. 29, fig. B (Hawaii).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 26 (Honolulu).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (French Frigate Shoals; Laysan).

Chaetodon frehmli bennetti KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 16 (Hawaii).

Yellow, with 9 blue longitudinal lines. No ocular band, but black predorsal blotch and black band from last dorsal rays across tail, but not on anal.

51113, 55094, 58534 U.S.N.M. Hawaii. Bureau of Fisheries. Four examples.
58537 U.S.N.M. Laysan Island. Max Schlemmer.

CHAETODON FLAVIROSTRIS Günther

Chaetodon flavirostris GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 41, pl. 32, fig. A. Vavau, Friendly Islands.—SEALE, Occ. Papers, Bishop Mus., vol. 4, No. 1, 1906, p. 64 (Faté, New Hebrides).

Suggestive of the design of *Chaetodon adiergastos* Seale but without dark lines on each row of scales longitudinally. Differs also in blackish vertical band from bases of dorsal rays crossing tail to bases of anal rays.

CHAETODON MITRATUS Günther

Chaetodon mitratus GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 16. Mauritius.

Snout moderately produced. Preopercle entire. Scales 35 in lateral line, 6 above, 15 below. D. XIII, 19; A. III, 14; dorsal and anal rounded posteriorly. Ocular band crosses head above orbits and not extending to interopercle. Broad oblique brown band from nape toward but not quite to soft anal; second parallel along back to lower side of tail. Dorsal with fine brown submarginal line. Anal, caudal and ventral yellowish. Length 94 mm. (Günther.)

CHAETODON MODESTUS Schlegel

Chaetodon modestus SCHLEGEL, Fauna Japon., Poiss., dec. 5 and 6, 1844, p. 80, pl. 4, fig. 2. Nagasaki.—RICHARDSON, Ichth. China Japan, 1846, p. 246 (China, Japan).—BLEEKER, Verh. Akad. Wetensch. Amsterdam, vol. 1, No. 1, 1854, p. (2)8 (Kaminoseki).—KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 153 (China, Japan).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 10 (Japan, China); Rep. Voy. Challenger, vol. 1, 1880, p 63 (Yokohama).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Canton).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Manila).—JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 535 (part).—FRANZ, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 49 (Fukuura and Yokohama).—SEALE, Philippine Journ. Sci., vol. 9, No. 1, 1914, p. 72 (Hong Kong).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 82 (Japan, Kobe, Yedo).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 38 (Seale's Hong Kong example described).

Coradion modestus SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 422 (Kogoshima).

Chaetodon ocellatus (not BLOCH) GRAY, Cat. Fish. Gronow, 1854, p. 68 (Indian Seas).

Chaetodon fallax AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 64 (on *Chaetodon modestus* JORDAN and FOWLER).

D. XII, 21 to 25; A. III, 18 to 21; scales 45 or 46. Brown. Blackish ocular band wide as eye. Black white edged ocellus at soft dorsal superiorly. Blackish bar at caudal base and brown bar across caudal peduncle.

Herre and Montalban have wrongly united *Coradion desmotes* Jordan and Fowler with this species.

CHAETODON TRICHROUS Günther

Chaetodon trichrous GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 40, pl. 36, fig. A. Society Islands.—JORDAN and SNYDER, Proc. U.S. Nat. Mus., vol. 29, 1906, p. 355, fig. 2 (Tahiti).

Body whitish anteriorly, yellowish posteriorly. Black ocular band broader below eye across side of breast to front of ventrals. Large blackish blotch medially from bases of last dorsal spines and front rays down till above anal spines. Ventral black.

CHAETODON CORALLICOLA Snyder

Chaetodon corallicola SNYDER, Bull. U. S. Fish. Comm., vol. 22, 1902 (1904), p. 53, pl. 11, fig. 20. Oahu Island in 27 to 29 fathoms.—JORDAN and EVERMANN, Bull. U. S. Fish. Comm., vol. 23, pt. 1, 1903 (1905), p. 374, pl. 46, fig. 1 (types).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).

Dark ocular band. Body more or less mottled with darker blotches. Caudal and pectoral pale. Ventral dusky terminally.

50880 U.S.N.M. Station 4032, Oahu, Hawaiian Islands. *Albatross* collection. Type.

55317 U.S.N.M. Hawaii. *Albatross* collection. Paratype.

CHAETODON MILIARIS Quoy and Gaimard

Chaetodon miliaris QUOY and GAIMARD, Voy. Uranie, Zool., 1824, p. 380, pl. 62, fig. 6. Hawaiian Islands.—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 26 (Hawaiian Islands).—KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 154 (Hawaiian Islands).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 31 (copied); Proc. Zool. Soc. London, 1871, p. 658 (Manado); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 46, pl. 35, fig. A (Hawaiian Islands).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado).—DAY, Fauna Brit. India, vol. 2, 1889, p. 7.—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 487 (Mindoro).—WEBER, Siboga Exp., vol. 57, Fische 1913, p. 306 (Taam Island).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 94 (Hawaiian Islands, Havai).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu), p. 34 (Samoa).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Laysan and French Frigate Shoals).

Tetragonoptrus (Tetragonoptrus) miliaris BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 39, pl. (15) 377, fig. 3 (Sumatra, Java, Celebes, Sangi, Ternate, Buru, Amboina, Ceram, New Guinea).

Choetodon (Tetragonoptrus) miliaris SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 259.

Chaetodon bellulus THIOLLIÈRE, Fauna Woodlark, 1857, p. 165. Woodlark Island.

Chaetodon mantelliger JENKINS, Bull. U. S. Fish. Comm., vol. 19, 1899 (1901), p. 394, fig. 1. Honolulu.

Chaetodon garretti AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 96 (on GÜNTHER, 1874, pl. 35, fig. A). Samoa.

Chaetodon punctulatus AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 97, pl. 2, fig. 8. Amboina and New Guinea.

Chaetodon guntheri AHL, Arch. Naturg. vol. 89, abth. A, Heft 5, 1923, p. 99 (on GÜNTHER, 1871). Manado.

Chaetodon dolosus AHL, Arch. Naturg. vol. 89, abth. A, Heft 5, 1923, p. 99 (on LIÉNARD). Mauritius.

D. XIII. 20 to 23; A. III, 18 to 20. Black ocular band from predorsal to gill opening. Yellow with 10 or 11 vertical rows or dark brown spots. Black bar on caudal peduncle. Fins yellow, anal sometimes with black edge. Reaches 150 mm.

Zanzibar, Mauritius, Madagascar, Ceylon, East Indies, Melanesia, Polynesia, Hawaii.

49699 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Type of *Chaetodon mantelliger.*

51151 U.S.N.M. Hawaii. Length 98 to 156 mm. 1901. Two examples (04553 and 565).

55155 U.S.N.M. Hanalei Bay, Hawaii. *Albatross* collection. Length 36 to 45 mm. Four examples.

55167 U.S.N.M. Honolulu. *Albatross* collection. Length 90 to 138 mm. Four examples.

55547 U.S.N.M. Hawaii. Length 118 mm.

82816 U.S.N.M. Maui. Wilkes Exploring Expedition. Length 84 to 110 mm. Seven examples.

CHAETODON CITRINELLUS Cuvier

Chaetodon citrinellus (Broussonet) Cuvier, Hist. Nat. Poiss., vol. 7 1831, p. 27. Guam; Tahiti.—Valenciennes, Règne Animal, Poiss., Ill., 1839, pl. 39, fig. 1 (Guam).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 33 (Amboina, Fiji); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 47, pl. 35, fig. B (Paumotus, Society Islands, Bonham Island, Samoa, Fiji).—Martens, Preuss. Exp. Ost -Asien, 1876, p. 388 (Amboina).—Ogilby, Mem. Queensland Mus., vol. 1, 1892, p. 54 (on *Chaetodon nigripes*).—Elera Cat. Fauna Filipin., vol. 1, 1895, p. 487 (Luzon, Batangas, Nasugbu).—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 357 (Kotosho, Formosa).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Jordan and Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—Weber, Siboga Exp., vol. 57, 1913, p. 306 (Karkaralang, Beo, Salibabu, Banda, Tuir, Rotti, Samau).—McCulloch, Austral. Zool., vol. 2, pt. 3, Feb. 10, 1922, p. 91, pl. 27, fig. 235c (New South Wales).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 104 (New Guinea, Jaluit, New Hanover, Amboina).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 34 (Samoa).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 68, pl. 14, fig. 1 (Luna, Parabir).

Tetragonoptrus citrinellus Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 234 (Ternate).

Chaetodon punctatus (Parkinson) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 28. Tahiti.

Chaetodon nigripes De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1885, p. 453. Queensland.

Chaetodon citrinellus var *semipunctatus* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 104 (on *Chaetodon citrinellus* var. Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 47, pl. 35, fig. *B*).

Depth 1¾ to 1⅘; head 2⅔ to 3¼, width 1⅞ to 2⅙. Snout 2⅔ to 3⅛ in head from snout tip; eye 2⅗ to 3, greater than snout in young to 1⅕ with age, greater than interorbital in young to equal with age; maxillary ⅔ to ¾ in snout, 3¾ to 4⅕ in head; interorbital 3 to 3⅖, convex. Gill rakers 3 + 18, short points, ⅛ of gill filaments, which 1½ in eye.

Scales 35 to 40 between gill opening and caudal base; tubes 32 to 33 in lateral line; 8 or 9 scales above lateral line, 16 or 17 below. Scales with 9 to 14 basal radiating striae; apical denticles 50 to 90, with 3 to 10 transverse series of basal elements; circuli fine.

D. XIII to XV, 20, I or 21, I, fourth spine 1⅕ to 1⅓ in total head length, fourth ray 1⅕ to 1½; A. III, 15, I to 17, I, second spine 1¼ to 1½, fourth ray 1⅕ to 1¼; least depth of caudal peduncle 2⅞ to 3⅙; caudal 1⅓ to 1⅖, hind edge little convex; pectoral 1 to 1⅛; ventral 1 to 1⅛.

Body dull brown, paler to whitish beneath. Each scale on side of trunk and tail with a median blue green to gray small rounded spot, following courses of scales all more or less as inclined rows above median body axis. Blackish brown band from just before spinous dorsal, joining its fellow, down to eye and across lower cheek to gill opening, but not on chest; above eye with marginal yellowish line in front and behind. Upper lip deep brown. Iris pale except as dark band crosses vertically. Fins all largely pale brownish. Soft dorsal with narrow deep brown submarginal line. Anal with lower edge black and submarginal yellow band. Paired fins tinged yellowish.

Zanzibar, Ceylon, East Indies, Philippines, Riu Kiu, Polynesia, Hawaii.

787 to 789, 9656 [1631]. Agojo point, Catanduanes Island. June 10, 1909. Length 94 to 101 mm.

499 to 501 [1573]. Biri Channel, Balicuatro Island. June 2, 1909. Length 85 to 99 mm. Pale brassy yellow, nearly silvery below. Ocular bar slightly narrower than eye, margined each side by narrower greenish yellow stripe above eye. Forehead and top of snout dusky. Side of body with rows of lavender spots; one on center margin of each scale, become orange on caudal peduncle and caudal fin and yellowish on soft dorsal and vertical anal edge; somewhat rosy on last two or three rows below. Front of dorsal spines black. Top of sixth and following spine white, continued as narrow white band on edge of soft dorsal, resting on narrow black band below which fin yellowish, continuation of yellow of spines; through center of spinous membranes beginning with fourth an opaque whitish spot forming sort of bar. Anal spines and terminal edge of fin black, below this pale sulphur bar, whitish on spinous membranes, basal half to ⅔ of fin body color, which buff near vertical third of fin, having orange spots. Caudal uniform yellowish, except orange spots noted. Pectoral dusky hyaline. Ventral dusky sulphur.

1198 to 1201. Cabugan Island, Hinunangan. July 30, 1909. Length 102 to 107 mm.

200 to 201, 206. Cabugao Bay, Catanduanes Island. June 9, 1909. Length 48 to 96 mm.

8087. Malanipa Island. September 8, 1909. Length 104 mm.

909. Maricaban Island. January 20, 1908. Length 97 mm.

4568. Mompog Island. March 3, 1909. Length 91 mm.

610. Murcielagos Bay. August 9, 1909. Length 90 mm.

4684. Nasugbu Bay. January 16, 1908. Length 101 mm. Generally pale canary yellow, white on belly and more dusky dorsally. Diffuse dusky about pectorals basally and above space between anal and ventrals, also below middle of spinous dorsal and soft dorsal posteriorly. Irregular rows of small roundish spots over entire surface, light bluish purple in central region becoming very dark dorsally and more or less orange over anal base. Chrome on soft dorsal posteriorly, caudal and caudal peduncle and soft anal posteriorly. Black ocular band, margins yellowish above and purplish on cheek. Forehead and snout dusky, sides of mouth yellow and chin dusky. Front dorsal spines to tenth black, tips white and white continued to vertical border of soft dorsal and black as very narrow submarginal line; upper part of incised spinous membrane yellow, with white or colorless band beneath. Outer half and front of anal spines black continued as broad marginal band across soft fin, below yellow bar with whitish outer margin which continues on spinous membranes. Caudal pale chrome. Ventral pale straw with black dots on rays.

404. Port Palapag. June 3, 1909. Length 78 mm.

678. Sablayan, Mindoro. December 13, 1908. Length 98 mm. Generally pale yellow, spots of purplish blue, become more or less bronzed posteriorly. Outer dorsal edge white on black line, fin yellowish below; bluish bar through center of spinous membranes from fourth to tenth. Anal edge black, very pale yellow above. Ocular band edged pale yellow above eye.

809. San Roque, Leyte Island. July 29, 1909. Length 105 mm. Generally dusky lemon, spots purplish blue becoming orange and brown below and posteriorly. Dorsal with white margin on black, more or less translucent bluish bar through center of spinous fin. Anal terminally black in opaque lemon central bar. Dark brown shade along dorsal base and yellowish on vertical portions of soft dorsal and anal. Caudal spotted at base.

9650. Sipadan Island. September 28, 1909. Length 89 mm.

1135. Sulade Island. September 18, 1909. Length 94 mm.

842. Teomabal Island. September 18, 1909. Length 100 mm.

52513 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 40 to 110 mm. Five examples.

71681 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 100 mm.

83313 U.S.N.M. No locality, likely Fiji or Samoa? Wilkes Exploring Expedition. Length 64 to 100 mm. Four examples.

CHAETODON QUADRIMACULATUS Gray

Chaetodon quadrimaculatus GRAY, Zool. Miscellany, 1833, p. 33. Hawaiian Islands.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 13 (type); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 38, pl. 30, fig. A (Upolu, Hawaiian Islands).—JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 373, pl. 49 (Honolulu).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston and Wake Islands).

Largely yellow. Dark orange ocular bar, with black and white bordering lines. Back dusky, with large whitish blotch below spinous dorsal and another below soft dorsal. Bluish longitudinal line on dorsal and anal.

Polynesia, Hawaii.

55482 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Length 127 mm.

55548 U.S.N.M. Hawaiian Islands. Length 124 to 138 mm. Two examples.

58521 U.S.N.M. Honolulu. E. L. Berndt. Length 95 mm.

CHAETODON MACULATUS Sauvage

Choetodon (*Tetragonoptrus*) *maculatus* SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 259 (on *Chaetodon tacheté* LIÉNARD, Dix. Rapp. Soc. hist. nat. Maurice, 1839, p. 36, Mauritius).

D. XIII, 23; A. III, 18. Yellowish gray with many small round black spots, forming 6 longitudinal lines obliquely down. Ocular band edged yellow each side. Caudal with blackish crescent. (Sauvage.)

CHAETODON GUTTATISSIMUS Bennett

Chaetodon guttatissimus BENNETT, Proc. Comm. Zool. Soc. London, vol. 2, 1832, p. 183. Ceylon.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 26 (type; Ceylon).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 34 (Zanzibar).—DAY, Fishes of India, pt. 1, 1875, p. 106, pl. 27, fig. 4 (type); Suppl. 1888, p. 786.—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 100 (Mauritius).

Chaetodon miliaris (part) DAY, Fauna Brit. India, vol. 2, 1889, p. 7.

Differs from *Chaetodon miliaris*, with which Day places it, in that each scale has a black spot and spots greatly increased, due to size of scales along bases of soft vertical fins. Dark ocular band not extending entirely over cheek. Caudal with dark median line.

One example (with 43937 U.S.N.M.) from Mauritius, through Colonel Nicholas Pike. Length 85 mm.

CHAETODON PUNCTATOFASCIATUS Cuvier

Chaetodon punctatofasciatus Cuvier, Hist. Nat. Poiss., vol. 7, 1839, p. 28. No locality.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 27 (type of *Chaetodon punctato-lineatus* Gray); Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Manila).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 308 (Banda).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 56 (Cebu).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 100 Amboina).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 27 (Honolulu).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 60, pl. 12, fig. 1 (Batangas and Calapan).

Citharoedus punctatofasciatus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 144 (Amboina).

Tetragonoptrus (*Tetragonoptrus*) *punctatofasciatus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 40, pl. (12) 374, fig. 3 (Buru, Obi, Solor, Amboina, Banda).

Chaetodon punctato-lineatus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 70. India.

Chaetodon multicinctus Garrett, Proc. Calif. Acad. Sci., vol. 3, 1865, p. 65. Hawaiian Islands.—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 44, pl. 34, fig. B (Honolulu).

Depth 1½ to 1⅗; head 2⅘ to 3⅖, width 1⅞ to 2⅒. Snout 2⅘ to 3 in head; eye 2⅗ to 2⅞, equals snout, greater than interorbital in young to equal with age; maxillary half way in snout, 4 in head; interorbital 2⅘ to 3⅛, broadly convex. Gill rakers 5 + 11, short points, ⅙ of gill filaments, which 1½ in eye.

Scales 29 to 32 between gill opening and caudal base; tubes 34 to 37 in lateral line; 7 or 8 scales above lateral line, 14 or 15 below. Scales with 11 to 15 basal radiating striae; apical denticles 64 to 137, with 16 to 18 series of basal elements transversely; circuli fine.

D. XIII, 22, I to 25, I, last spine 1⅛ to 1⅖ in head, eleventh ray 1⅕ to 1½; A. III, 17, I or 18, I, last spine 1⅓ to 1½, third ray 1¼ to 1⅖; least depth of caudal peduncle 2¾ to 3⅛; caudal 1⅖ to 1½, hind edge little convex; pectoral 1 to 1⅛; ventral 2⅘ to 3⅛ in combined head and body.

Back brown with slight olive tint, abdomen, breast and lower surface of head pale to whitish. On back, from bases of dorsals, 8 deep brown vertical bands, mostly parallel, fourth to sixth widest and extend down half way in body depth. Scales between dark bands and within their areas, also all of lower side of body each with variable dark brown blotch, though blotches of costal region largest and most contrasted or darker. Black predorsal saddle like blotch little smaller than eye. Above eye less than eye-diameter white band down through eye and across cheek to lower edge of preopercle, above broader than pupil and below narrower, also front and hind edges each with dark bordering line. Upper lip deep brown. Soft dorsal and anal broadly edged yellow, with black submarginal line shading into dark gray down on fin. Outer half of caudal pale, with median black transverse line expanded medially or somewhat crescentic in some specimens; fin yellowish basally, and in young dark transverse basal line. Paired fins light brownish, membranes of ventrals with some dark brown.

East Indies, Melanesia, Hawaii. The species is sometimes with variation in the dark vertical bands, as they may be irregular on one side and constant on the other side of the same individual. Sometimes these bands may be more waved than usual or two may be joined by a dark crossbar.

4843 and 4844. Biri Channel. June 1, 1909. Length 82 to 94 mm.

4855. Cagayanes Island. March 31, 1909. Length 64 mm.

3900. Cebu market. April 4, 1908. Length 71 mm.

22146. Cebu market. August 28, 1909. Length 71 mm.

8134. Dasol Bay. May 9, 1909. Length 76 mm.

4710. Ligpo Point, Balayan Bay. January 18, 1908. Length 92 mm.

4883. Little Santa Cruz Island. May 28, 1908. Length 82 mm.

1264, 1277, 3592, 3640, 3641, 4710. Mactan Island, Cebu. March 25, 1909. Length 82 to 90 mm. Generally sulphur yellow, with 8 irregular vertical olive green bars, widest posteriorly. Entire back, sides and below with numerous small round green spots. Black median predorsal blotch. Top of head and snout olive green. Yellow stripe begins over eye, extends down on cheek, bordered each side with black and pale blue line. Lower side of head, breast and snout paler yellow than body. Mandible tip pale blue. Belly between ventral and anal white, margined by yellow line. Scaled portion of dorsal nearly uniformly green like bars on sides; tips of spines and rays greenish yellow, become chrome yellow posteriorly; narrow pale blue line next to yellow edge, then narrow black line. Anal base green like dorsal, margin pale yellow, with submarginal yellow and blue stripe which wider than on dorsal, then black one adjoins. Base of caudal pale yellow margined by black bar, terminal ⅔ of fin colorless. Caudal peduncle vermilion, extends also on basal ⅔ of last anal rays. Pectoral colorless. Ventral rays dirty straw color.

5774 and 16148. Mahinog, Camiguin Island. August 3, 1909. Length 64 to 86 mm.

3893. Maribojoc Bay, Bohol Island. March 26, 1909. Length 80 mm.

1074 and 1075. Masbate reef, Masbate. April 20, 1908. Length 90 mm.

611 and 21980. Murcielagos Bay. August 9, 1909. Length 77 to 89 mm. Three examples.

4756 and 4757. Northwest of Verde Island. July 22, 1908. Length 90 to 95 mm.

735, 3903, 20568. Opol, Mindanao Island. April 4, 1908. Length 57 to 88 mm.

372 to 374. Paluan Bay, Mindoro Island. December 11, 1908. Length 83 to 90 mm.

627 and 628. Port Banalacan, Marinduque. February 23, 1909. Length 85 to 86 mm.

1189, 1190, 1233, 15111, 15112. Port Dupon, Leyte Island. March 17, 1909. Length 80 to 93 mm.

7978. Port Galera, Mindoro Island. October 27, 1909. Length 73 mm.

10308. Port Maricaban. July 21, 1908. Length 88 mm.

1186. Port Matalvi. November 23, 1908. Length 81 mm.

405. Port Palapag. June 3, 1909. Length 75 mm.

7802. Port San Pio Quinto, Camiguin Island. November 8, 1908. Length 96 mm.

1299. Port San Pio Quinto. November 11, 1908. Length 91 mm.

8274. Romblon. March 26, 1908. Length 52 mm. [467]. Sides barred with sulphur yellow and dusky purplish, purple shades very slight. Lower sides with pale yellow, bases of scales with black spot. Forehead dusky running to point of snout. Black saddle on nape, after interruption continued as ocular bar narrower than eye with center bright cadmium yellow. Opercle tip with dusky blotch, anteriorly more yellowish. Lower head and breast more or less dusky. Scaled portion of dorsal dusky with yellowish shades, soft fin very narrowly edged dusky; tips of spines yellowish green continued as submarginal band on soft dorsal, adjoining below narrow white line and then broader black line, disappearing on fifth spine and fading out on lower vertical edge of fin, last tipped with orange. Soft anal narrowly creamy white, spines and broad submarginal band on soft fin soiled greenish white with black submarginal line separated from greenish by gray portion anteriorly. Front part of caudal peduncle orange dusky, posteriorly pale yellow with dusky, separated by narrow black lines from orange in front and dusky hyaline of terminal portion of caudal fin. Pectoral dusky hyaline. Ventral dusky greenish white.

488. Sablayan, Mindoro. December 12, 1908. Length 90 mm.

585. Sablayan. December 13, 1908. Length 91 mm.

3604. Danawan and Si Amil Islands. September 26, 1909. Length 87 mm.

4813. Gomomo Island. December 3, 1909. Length 78 mm.

19230. Tapiantana Island. September 13, 1909. Length 86 mm.

10436. Varadero Bay, Mindoro. July 23, 1908. Length 96 mm.

14407. Talisse Island. November 9, 1909. Length 80 mm

459. Basa Island, Gulf of Boni, Celebes. December 7, 1909. Length 90 mm.

4802. Limbe Strait, Celebes. November 10, 1909. Length 89 mm.

4829. Sadaa Island, Celebes. November 17, 1909. Length 77 mm.

53366. U.S.N.M. Honolulu. *Albatross* collection. Length 95 mm.

84221. U.S.N.M. Cebu. Dr. F. Baker. Length 90 mm.

CHAETODON NOTOPHTHALMUS Ahl

Chaetodon notophthalmus AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 81, pl. 2, fig. 10. Locality?

Snout equals eye. Preopercle rounded. Scales 47 in lateral line, 8 above, 22 below. D. XI, 25; A. III, 19; dorsal and anal rounded posteriorly. Golden yellow. Brown ocular bar to obsolete blotch on chest. Wide obsolete band from third to fifth dorsal spines behind gill openings till above pectoral origin to ventral and behind. Breast, from dark band to gill cover, clear yellow. Another dull band from last dorsal spines to middle of anal. Obsolete band on caudal peduncle. Deep black longitudinal blotch on last spines and first dorsal rays. Between broad body bands on lower half of body each scale with silver white spot as 8 to 10 longitudinal rows. Soft dorsal and anal with black submarginal line next to white border. Caudal with crescentic band and clear border. Pectoral yellow. Length 135 mm. (Ahl.)

CHAETODON TRICINCTUS Waite

Chaetodon tricinctus WAITE, Rec. Austral. Mus., vol. 4, 1901, p. 45, fig. 12. Lord Howe Island; Rec. Austral. Mus., vol. 5, 1903, p. 32 (Lord Howe Island).

D. XII, 20; A. III, 17; scales 40. Yellowish, with 3 broad black vertical bands, first ocular, second from middle of spinous dorsal to belly and third from front of soft dorsal to anal. Length 97 to 185 mm. (Waite.)

CHAETODON MARLEYI Regan

Chaetodon marleyi REGAN, Ann. Durban Mus., vol. 3, pt. 1, 1921, p. 1. East London, South Africa, 40 fathoms.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 251 (Natal).—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, October, 1927, p. 613 (False Bay, Agulhas Bank, East London, Natal, 50 fathoms).

Depth 1½; head 2⅘, width 2⅒. Snout 3⅛ in head; eye 2⅞; maxillary 3½, reaches opposite hind nostril; interorbital 3¼. Gill rakers 5+10. Tubes 37 in lateral line; scales 43 in median lateral series to caudal base, 6 above lateral line, 22 below. D. X, 24, I; A. III, 18, I; caudal 1½ in head, truncate; pectoral 1¼ in head; ventral 1⅓. Dusky brown streak from occiput to snout tip. Ocular dark band from spinous dorsal origin to eye and over cheek. Second dark band from third to fifth dorsal spines to ventral and pectoral bases; third from front of soft dorsal toward front of soft anal; fourth across caudal peduncle anteriorly; fifth at caudal base. Terminal half of second membrane of spinous dorsal black. Large black ocellus with narrow white edge, on soft dorsal front. Ventral whitish, outer edges dusky. Length 60 mm.

South Africa. Orginally described by Regan from an example 140 mm. long. The above description from an example in the Academy of Natural Sciences of Philadelphia from Natal.

CHAETODON AUREOFASCIATUS Macleay

Chaetodon aureofasciatus MACLEAY, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 351, pl. 8, fig. 3. Port Darwin, Queensland.—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 360 (Port Darwin).—MCCULLOCH, Rec. Austral. Mus., vol. 14, No. 1, 1923, p. 6, pl. 2, fig. 2 (Holbourne Island, Queensland).

Deep as long without caudal. Snout short. Mouth very small. Scales 40. D. XI, 21; A. III, 16. Brownish yellow. Golden ocular band from predorsal to and on breast. Another from humeral region to hind opercle edge through pectoral base to belly. Young with double band across caudal base. Length 127 mm. (Macleay.)

CHAETODON RAINFORDI McCulloch

Chaetodon rainfordi McCulloch, Rec. Austral. Mus., vol. 14, No. 1, 1923, p. 4, pl. 2, fig. 1. Holbourne Island, off Port Denison, Queensland.

According to McCulloch differs from *Chaetodon aureofasciatus* in the presence of 3 broad, dark bands transversely on the body, besides 2 anteriorly. Length 118 mm.

CHAETODON OCTOFASCIATUS Bloch

Chaetodon octofasciatus Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 113, pl. 215, fig. 1. East Indies.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1262 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 403 (on Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 223 (India).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 460, 491 (East Indies).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 17 (no locality).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 17 (Singapore).—Kner, Reise Novara, Fische, 1865, p. 98 (Java).—Günther, Cruise of Curaçao, Brenchley, 1873, p. 410 (Misol, Moluccas).—Day, Fishes of India, pt. 1, 1875, p. 108.—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Singapore, Sarawak).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Rubi, New Guinea).—Day, Fauna Brit. India, vol. 2, 1889, p. 9.—Pellegrin, Bull. Soc. Zool. France, vol. 30, 1905, p. 84 (Baie d'Along, Tonkin).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 96 (Bacon).—Cockerell, Mem. Queensland Mus., vol. 3, 1915, p. 44 (Queensland).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923,p. 84 (East Indies, New Guinea, Indian Ocean, Mysol, Zanzibar, Matschin on Bougainville Island, Talassia on New Pomerania).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September 1927, p. 39 (Sisiman, Estancia, Basbas Island).

Chetodon octofasciatus Bonnaterre, Tabl. Ichth., 1788, p. 85, pl. 55, fig. 211 (East Indies).

Citharoedus octofasciatus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 142.

Tetragonoptrus (Tetragonoptrus) octofasciatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 38, pl. (14) 376, fig. 3 (Singapore, Banka, Java, Duizend Islands, Bawean, Sumbawa, Celebes, Amboina, Ceram).

Chaetodon octolineatus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 69. Indian Ocean.

Depth 1⅖ to 1½; head 2⅗ to 3, width 1⅞ to 2. Snout 3 to 3⅕; eye 2⅖ to 2⅞, greater than snout in young to equal to its length with age, likewise interorbital; maxillary reaches opposite hind nostril, 3¾ to 4 in head; interorbital 3⅛ to 3¼, broadly convex. Gill rakers 5+9, short slender points, ⅕ of gill filaments, which 1⅔ in eye.

Scales 42 or 43 between gill opening and caudal base; tubes 32 or 33 in lateral line; 9 to 11 scales above lateral line, 22 or 23 below. Scales with 8 or 9 basal radiating striae; apical denticles 43 to 85, with 2 to 5 transverse series of basal elements; circuli fine.

D. X or XI, 19, I or 20, I, last spine 1⅗ to 1⅔ in head, fifth ray 1⅓ to 1½; A. III, 16, I or 17, I, second spine 1⅖ to 1⅗, fifth ray, 1¼ to 1⅖; least depth of caudal peduncle 3 to 3⅓; caudal with hind edge truncate, 1¼ to 1⅔; pectoral 1⅕ to 1¼; ventral 1 to 1⅕.

Pale brownish generally inclining to whitish on lower surface of head and abdomen. Eight blackish brown transverse bands, each much narrower than pale interspaces, though extend on vertical fins. First ocular, from predorsal; second little arched forward to embrace hind portion of opercle; seventh on caudal peduncle, broader in young and in very young as black ocellus. In addition, blackish median frontal band from above eyes to snout tip. Hind edge of both dorsal and anal narrowly blackish and blackish transverse band at caudal base; more diffuse with age. Iris whitish except for ocular band, which not meeting its fellow on breast. Paired fins whitish. Obscure pale dusky blotch, not so dark as vertical bands, though slightly larger than eye, just below lateral line and between fourth and fifth transverse blackish band.

India, East Indies. In young examples the last six transverse bands are arranged more as pairs.

1279. Alimango Bay, Burias Island. March 5, 1909. Length 87 mm.
16009. Alimango Bay. June 5, 1909. Length 76 mm.
4841 and 4842. Beacon Reef, Catbalogan, Samar Island. April 16, 1909. Length 94 mm.
4746, 10851. Biri Channel. June 1, 1909. Length 39 to 49 mm.
3595, 3603, 4761. Biri Channel. June 2, 1909. Length 60 to 77 mm.
470 and 1052. Bolalo Bay, Palawan Island. December 21, 1908. Length 74 to 75 mm.
One example. Buang Bay, Talajit Island. March 15, 1909. Length 88 mm.
3602, 15185 to 15187, 15306. Busin Harbor, Burias Island. March 7, 1909. Length 61 to 74 mm.
166, 284, 462, 614, 615, 3611. Busin Harbor. March 8, 1909. Length 39 to 72 mm.
860 to 863, 869 to 871, 971, 972, 4775. Busin Harbor. April 22, 1908. Length 43 to 73 mm.
824 to 827. Butauanan Island. June 12, 1909. Length 63 to 72 mm.
689, 692, 3624, to 3627, 15810. Butauanan Island. June 13, 1909. Length 55 to 87 mm.
885, 886, 4847, 4848. Canimo Island near Daet. June 15, 1909. Length 57 to 65 mm.
3916, 3917, 12733. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 65 to 80 mm.
857 to 859. Capunuypugan Point. May 9, 1908. Length 70 to 74 mm.
22807. Cataingan Bay, Masbate. April 18, 1908. Length 62 mm.
4824. Cataingan Bay. April 17, 1908. Length 55 mm.
828 to 839, 1095. Catbalogan. April 15, 1908. Length 66 to 90 mm.
520 to 523. Catbalogan. April 16, 1908. Length 69 to 103 mm.
659, 3588 to 3590. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 57 to 76 mm.
728 and 943. Cebu market. April 5, 1908. Length 73 to 82 mm.
1145. Cebu market. April 6, 1908. Length 86 mm.
345 to 348, 9667, 9668. Endeavor Strait. December 22, 1908. Length 64 to 82 mm.

1131 and 9856. Endeavor Strait. December 23, 1908. Length 80 to 84 mm.

799 and 959. Langao Point, Luzon. June 24, 1909. Length 72 to 77 mm.

335 and 336, 21847. Limbones Cove, Luzon. February 8, 1909. Length 70 to 97 mm.

7968. Little Santa Cruz Island. May 28, 1908. Length 81 mm.

810, 3886, 21095. Maculabo Island. June 14, 1909. Length 55 to 80 mm.

1258. Makesi Island. April 5, 1909. Length 77 mm.

1140. Mansalay Bay. June 4, 1908. Length 79 mm.

1132, 1133, 16155. Mantacao Island, west coast of Bohol. April 8, 1908. Length 62 to 73 mm.

1034. Masamat Bay, Quinalasag Island. June 12, 1909. Length 60 mm.

1082. Masbate Reef, Masbate. April 20, 1908. Length 68 mm.

915 and 916. Nabatas Point, Samar Island. July 24, 1909. Length 85 mm.

388 and 3605. Near Palag Bay, Luzon. June 16, 1909. Length 52 to 63 mm.

360 and 361, 15352. Papagas Bay, Luzon. February 20, 1909. Length 85 to 97 mm.

1315. Polloc. May 23, 1908. Length 70 mm.

353 and 354. Port Caltom. December 15, 1908. Length 75 to 77 mm.

731. Port Galera. June 9, 1908. Length 75 mm.

1017. Port Matalvi. November 22, 1908. Length 80 mm.

979 to 981, 1184, 1185. Port Matalvi. November 23, 1908. Length 75 to 87 mm.

742 to 746, 748 to 750. Port Uson, west of Pinas Island. December 17, 1908. Length 62 to 86 mm.

4733. Quinalasag Island, Masamat Bay. June 12, 1909. Length 70 mm.

873. Ragay Bay. March 10, 1909. Length 55 mm.

20985. Rapurapu Island. June 22, 1909. Length 65 mm.

534 to 540, 1168 to 1170. San Juanico Strait. April 13, 1908. Length 39 to 64 mm.

764, 765, 993. San Miguel Harbor, Ticao Island. April 21, 1908. Length 64 to 68 mm.

807, 808, 4749. San Roque, Leyte Island. July 29, 1909. Length 58 to 102 mm.

568, 569. Surigao, Mindanao. May 8, 1908. Length 66 to 70 mm.

8672. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 87 mm.

1056 and 16076. Ulugan Bay, Oyster Inlet. December 28, 1908. Length 75 to 77 mm.

4736 and 4737. Ulugan Bay, Palawan. December 28, 1908. Length 80 to 84 mm.

512. Ulugan Bay near Rita Island. December 29, 1908 Length 78 mm.

428. Gane Road, Gillolo Island, Dutch East Indies. December 1, 1909. Length 39 mm.

474. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 75 mm.

20805. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 66 mm.

421 to 423, 463. Togian Bay, Togian Island. November 19, 1909. Length 50 to 60 mm.

420. Great Tobea Island. December 14, 1909. Length 60 mm.

419. Great Tobea Island. December 15, 1909. Length 64 mm.

55969 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 80 mm. [3894].

CHAETODON PELEWENSIS Kner

Chaetodon pelewensis KNER, Sitz. Ber. Akad. Wiss. Wien, Math.-Naturw. kl., vol. 57, Heft 1, 1868, p. 308. Pelew Islands.—GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 43, pl. 31, fig. B (Pelew Islands, Samoa, Society Islands, Paumotus, New Hebrides).—JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 340 (Apia and Pago Pago).—FOWLER and SILVESTER, Marine Papers, Carnegie Inst., 1922, p. 123 (Pago Pago).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam).

Chaetodon germanus DE VIS, Proc. Linn. Soc. New South Wales, vol. 9, 1884, p. 454. Queensland.

Pale vertical bar through eye down to cheek medially, edges dark. Black blotch close before spinous dorsal. Body with eight oblique dusky brown bands, anteriorly on trunk broken as dark spots. Black submarginal line on dorsal and anal, latter wider. Black crescent on caudal.

52196 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Four examples.

CHAETODON LUNULA (Lacépède)

Pomacentrus lunula LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1803, pp. 507, 511 513. No locality (on COMMERSON).

Chaetodon lunula CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 59, pl. 173, (East Indies, Mauritius, Prince of Wales Island).—BENNETT, Proc. Comm. Zool. Soc. London, 1831, p. 61 (Mauritius).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 25 (Prince's Island; Amboina).—GUICHENOT, Notes I. Réunion, vol. 2, 1862, p. 25.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 34 (Zanzibar).—CAPELLO, Jorn. Soc. Sci., Lisboa, 1871, p. 200 (Mozambique).—GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 42, pl. 33 (Hawaiian Islands).—DAY, Fishes of India, pt. 1, 1875, p. 108.—PETERS, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—GÜNTHER, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 486 (copied).—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 53.—PFEFFER, Ost Afrika Fisch., 1903, p. 8 (Kokotoni).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, pt. 3, 1909, p. 227 (Natal).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 422 (Aikawa, Misaki, Akume, Tanegashima).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 114 (Gilbert Islands, Jaluit, Amboina, Mauritius, Mikindani, East Africa).—MCCULLOCH, Rec. Austral. Mus., vol. 14, No. 1, 1923, p. 4 (New Hebrides, Amboina, Two Isles, off Cape Bedford, Queensland).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 251 (Natal); Bishop Mus. Bull., No. 22, 1925, p. 11 (Guam), p. 27 (Honolulu), p. 33 (Samoa).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Wake Island).—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, October 1927, p. 610 (Natal).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 286 (Vigan, Philippines).

Chaetodon lunulatus QUOY and GAIMARD, Voy. Uranie, Zool., 1825, p. 381. Hawaiian Islands.

Chaetodon biocellatus CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 62. Oualan.—LESSON, Voy. Coquille, Zool., 1830 (1831), p. 176 (Oualan).—GUICHENOT, Notes I. Réunion, vol. 2, 1862, p. 26.—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—GUIMARAES, Jorn. Soc. Sci. Lisboa, 1882, p. 31 (Mozambique).

Chaetodon ocellatus (not BLOCH) BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. (204) 212 (Timor, Kupang).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Manila, Malabon).

Chaetodon occellatus SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 283 (Sandakan, north Borneo).

Chaetodon fasciatus (not FORSKÅL) KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 150.—DAY, Fishes of India, Suppl., 1888, p. 786 (note); Fauna Brit. India, vol. 2, 1889, p. 8.—JORDAN and EVERMANN, Proc. U. S. Nat. Mus., No. 25, 1903, p. 357 (Kotosho, Formosa, Honolulu).—WEBER, Siboga Exp., vol. 57, 1913, p. 304 (Nusa Laut, Banda, Ki Islands, Elat).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September 1927, p. 52, pl. 9, fig. 2 (Currimao, Balaoan, Manila Bay, Monja, Batangas, Calapan, Cebu, Cotabato).

Tetragonoptrus (*Chaetodontops*) *fasciatus* BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 41, pl. (12) 374, fig. 1 (Java, Bawean, Borneo, Celebes, Sangi, Timor, Halmaheira, Buru, Amboina, Ceram, Banda, New Guinea); Verh. Akad. Wetens. Amsterdam, vol. 18, No. 3, 1879, p. 1 (Mauritius).

Chaetodon wiebeli KAUP, Nederland. Tijds. Dierk., vol. 1, 1863, p. 127. Canton.

?Chaetodon bella-maris SEALE, Philippine Journ. Sci., vol. 9, pt. 1, 1914, p. 72, pl. 1, fig. 1. Hong Kong.—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 111, pl. 1, fig. 1 (Takao, Canton, Hong Kong).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 46, pl. 17, fig. 1 (type).

?Chaetodon dorsiocellatus AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 111, pl. 1, fig. 1. Takao, Formosa.

Depth 1⅗ to 1¾; head 2½ to 2⅞, width 2 to 2⅕. Snout 2⅗ to 3 in head from snout tip; eye 3⅛ to 4, 1 to 1⅗ in snout, little greater than interorbital in young to 1⅛ with age; maxillary ½ to ⅔ in snout, 3½ to 4 in head; interorbital 3¼ to 3½, broadly convex. Gill rakers 4+13, short points, ¼ of gill filaments, which 1⅖ in eye.

Scales 35 or 36 in median lateral series between gill opening and caudal base; tubes 31 to 36 in lateral line; 7 or 8 scales above lateral line, 16 or 17 below. Scales with 10 to 11 basal radiating striae, with as many as 4 incomplete auxiliaries; apical denticles 49 to 200, with 5 to 15 transverse series of basal elements; circuli fine.

D. XII, 23, I, or 24, I, last spine 1⅖ to 1¾ in total head length, tenth ray 1⅓ to 1⅗; A. III, 18, I, third spine 1⅞ to 2, fifth ray 1½ to 1⅗; least depth of caudal peduncle 3⅛ to 3⅔; caudal slightly convex behind, 1⅗ to 1⅞; pectoral 1¼ to 1⅓; ventral 1⅛ to 1⅓.

Back brownish olive, becoming pale brown below. Broad blackish-brown ocular band, entirely across cheek in young, but not below preopercle edge with age, also much broader with age, with narrow white bordering line in front and posteriorly above narrower white band separates darker colors of predorsal. From above pectoral to suprascapular region broad blackish band up to middle of spinous dorsal, bordered broadly whitish and narrowing above. Also narrow blackish bar or band along bases of front dorsal spines, bordered with whitish below. Iris dusky brown. Narrow pale band from spinous dorsal, medial curves back over soft dorsal and down at front of caudal peduncle, where wider and forms blackish band over latter. Margins of dorsals and anals blackish brown, with narrow pale submarginal line. Caudal with submarginal blackish-brown band transversely; also medial diffuse dark brown band. Each row of body scales with broad median brown band, follows obliquely over sides.

Red Sea, Zanzibar, Mauritius, Bourbon, Andamans, East Indies, Melanesia, Polynesia, Hawaii. The species is very variable with age, the young having a large black ocellus on the soft dorsal and another on the caudal peduncle.

8170. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 167 mm.
8115, 19271. Alimango Bay, Burias Island. March 5, 1909. Length 158 to 171 mm.
8350. Buang Bay, Talajit Island. March 15, 1909. Length 180 mm.
1030. Capunuypugan Point. May 10, 1908. Length 140 mm.
7519. Chase Head, Endeavor Strait. December 22, 1908. Length 185 mm.
1293. Endeavor Strait. December 23, 1908. Length 125 mm.
8242. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 185 mm.
5414, 5415. Mactan Cove, Mactan Island. April 6, 1908. Length 155 to 172 mm.
8843. Maculabo Island. June 14, 1909. Length 195 mm.
6185, 6186. Mansalay, Mindoro. June 4, 1908. Length 160 to 165 mm.
1035. Masamat, Quinalasag. June 12, 1909. Length 120 mm.
6276. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 155 mm.
4863. Nasugbu Bay. January 16, 1908. Length 175 mm.
8878, 8879. Near Palag Bay, Luzon. June 16, 1908. Length 188 to 190 mm.
3904, Pagapas Bay, Luzon. February 20, 1909. Length 80 mm.
12. Pandanon Island. March 23, 1909. Length 115 mm.
A586. Panpan Point, Tara Island. September 20, 1909. Length 195 mm.
6381. Port Jamelo. July 13, 1908. Length 180 mm.
7323. Sablayan Bay, Mindoro. December 12, 1908. Length 169 mm.
679 to 683. Sablayan. December 13, 1908. Length 49 to 90 mm.
One example. Silino Island. August 10, 1909. Length 29 mm.
5728. Surigao, Mindanao. May 8, 1908. Length 184 mm.
207. Taganak Island. January 7, 1909. Length 143 mm.
7372. Tara Island. December 15, 1908. Length 165 mm.
1005. Tataan, Simaluc Island. February 20, 1908. Length 130 mm.
5834, 5835. Tataibada Point. May 15, 1908. Length 165 to 166 mm.
532, 395. Usada Island. March 5, 1908. Length 138 mm.
6652. Varadero Bay, Mindoro. July 23, 1908. Length 184 mm.
A859. Limbe Strait, Celebes. November 9, 1909. Length 198 mm.
A991. Togian Bay, Togian Island. November 19, 1909. Length 185 mm.
4445, 4691. Apra Bay, Guam. November 19-20, 1907. Length 128 to 154 mm.
11277 U.S.N.M. Akune, Satsuma, Japan. *Albatross* collection, 1906. Length 63 to 78 mm. Two examples.
43930 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 90 to 148 mm. Four examples.
52299 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 133 to 180 mm. Four examples.
One example (with 52497 U.S.N.M.). Apia. Bureau of Fisheries, 1902. Length 26 mm.

55103 U.S.N.M. Honolulu, Hawaiian Islands. *Albatross* collection. Length 140 mm.

55345 U.S.N.M. Puako Bay, Hawaii. *Albatross* collection, 1906. Length 30 to 54 mm. Three examples.

55346 U.S.N.M. Waialua Bay, Oahu. *Albatross* collection, 1902. Length 37 mm.

55347 U.S.N.M. Honolulu. *Albatross* collection, 1906. Length 23 to 31 mm. Four examples.

One example (with 55548 U.S.N.M.). Hawaii. Length 111 mm.

57000 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 122 to 132 mm. Two examples.

65103 U.S.N.M. Honolulu. *Albatross* collection.

65791 U.S.N.M. Paumotus. *Albatross* collection. Length 153 mm.

65792 U.S.N.M. Arno Atoll, Marshalls. *Albatross* collection, 1899–1900. Length 17 mm. *Tholichthys* stage.

65802 U.S.N.M. Wotji Atoll. *Albatross* collection. Length 25 mm. *Tholichthys* stage.

70767 U.S.N.M. Aikawa, Rikuzen. *Albatross* collection, 1906. Length 20 to 25 mm. Two examples.

71733 U.S.N.M. Nafa, Okinawa, Riu Kiu Islands. *Albatross* collection, 1906. Length 30 to 49 mm. Four examples.

75837 U.S.N.M. Oahu. Wilkes Exploring Expedition. Two examples.

78077 U.S.N.M. Hilo, Hawaii. Bureau of Fisheries. Length 22 to 60 mm. Four examples.

71290 U.S.N.M. Misaki, Sagami, Japan. *Albatross* collection, 1906. Length 21 to 31 mm. Five examples.

CHAETODON ADIERGASTOS Seale

Chaetodon adiergastos SEALE, Philippine Journ. Sci., vol. 5, No. 2, July, 1910, p. 116, pl. 1, fig. 2. Batayan Island, Philippines.—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 50, pl. 15, fig. 1 (Mariveles, Hamilo, San Miguel Bay, Calapan, Inabanga, Guindulman, Gigantangan, Carnasa, Bantayan, Buenavista Guiminatin, Bungau).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 286 (Philippine example).

Chaetodon fasciatus (not FORSKÅL) FOWLER, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).

Chaetodon chrysozonus (not CUVIER) FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 55 (Cebu).

Depth 1⅓ to 1⅖; head 2⅔ to 2⅘, width 2 to 2⅕. Snout 2⅞ to 3 in head; eye 3⅛ to 3¾, 1⅕ to 1¼ in snout, slightly greater than interorbital in young to 1¼ with age; maxillary ½ to ⅔ in snout, 4 to 4½ in head; interorbital 3¾ to 4, broadly convex. Gill rakers 4+9, short broad points, 6 in gill filaments, which 1⅕ in eye.

Scales 28 to 30 between gill opening and caudal base; tubes 33 to 35 in lateral line; 8 to 10 scales above lateral line, 15 or 16 below. Scales with 7 to 19 basal radiating striae; apical denticles 85 to 164, with 8 to 13 transverse series of basal elements; circuli very fine.

D. XII, 23, I, to 25, I, last spine 1⅔ to 2 in head, twelfth ray 1⅖ to 1⅗; A. III, 19, I, to 21, I, third spine 1⅞ to 2, tenth ray 1⅓ to

$1\frac{1}{2}$; least depth of caudal peduncle $3\frac{1}{10}$ to $3\frac{2}{5}$; caudal $1\frac{3}{5}$ to $1\frac{3}{4}$, hind edge broadly convex; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $1\frac{1}{3}$ to $1\frac{2}{5}$.

Light brown, little paler on lower surface of head, breast, abdomen. Broad black blotch from above eye, slightly wider than eye, down and over cheek and lower side of head, but not on chest. Small variable occipital saddle-like black blotch. On each row of scales on body diffuse deep band narrowing above and below, all sloping obliquely up and back and above lost in darker brownish at bases of dorsals. Dorsals marginally deep brown, with submarginal pale line. Soft anal similar. Caudal with pale posterior margin, then broad deep brown submarginal transverse band and before parallel pale diffuse band; base of fin deep brown. Paired fins dull brown.

Greatly resembles *Chaetodon lunula* but without the dark markings on the back along the bases of the dorsals and caudal peduncle. In the young the black blotch is present in the postero-median dorsal rays over their outer portion and but little smaller than eye. Also its caudal with terminal half pale.

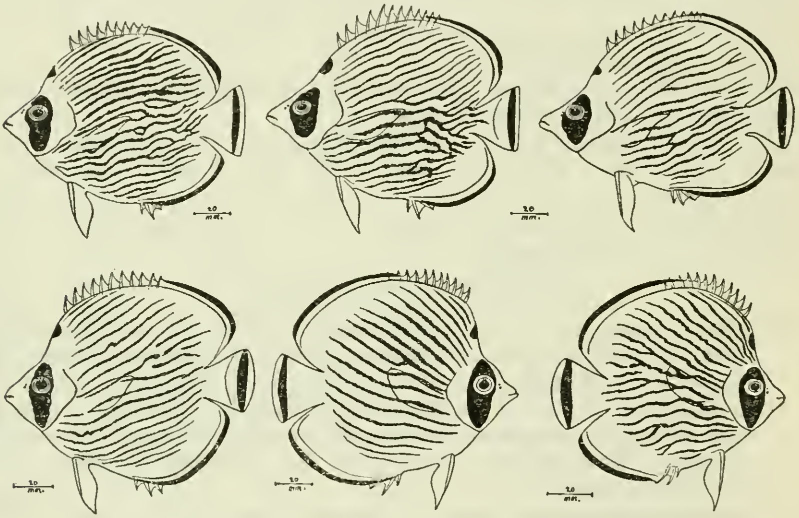
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.

FIG. 6.—VARIATION OF COLOR MARKINGS OF CHAETODON ADIERGASTOS SEALE

1322, 8171, 8172. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 130 to 141 mm.

1058 and 8114. Alimango Bay, Burias Island. March 5, 1909. Length 138 to 143 mm.

8933. Atulayan Island, Lagonoy Gulf. June 18, 1908. Length 164 mm.

8348. Buang Bay, Talajit Island. March 15, 1909. Length 157 mm.

767. Busin Harbor, Burias Island. March 7, 1909. Length 105 mm.

923, 1031, 1155, 5678. Busin Harbor. April 23, 1908. Length 105 to 137 mm.

8033. Capulaan. February 24, 1909. Length 148 mm.

4785. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 67 mm.

7723, 7752, 7754. Caxisigan Island, Balabac. January 2, 1909. Length 143 to 152 mm.

1142 and 1143. Cebu market. April 6, 1908. Length 92 to 95 mm.

556. Daisy Islet. January 6, 1910. Length 107 mm.

1158 and 1159. Iloilo market. January 2, 1908. Length 93 to 122 mm.

7915. Limbones Cove. February 8, 1909. Length 155 mm.

6024. Little Santa Cruz Island. May 28, 1908. Length 160 mm.

1128 [508]. Mactan Cove. April 6, 1908. Length 100 mm. Pearl gray, oblique stripes pale golden umber. Ocular bar black and yellowish shade between upper ends. Top of snout orange. Dorsal spines cadmium orange anteriorly, membranes sulphur yellow and margin dark umber, including tips of posterior spines; submarginal bar sulphur yellow, dusky orange beneath. Anal like dorsal, tips of spines umber instead of orange. Caudal like soft dorsal and anal but tip hyaline. Pectoral dusky hyaline, axil yellow. Ventral sulphur yellow, rays more dusky.

6184. Mansalay, Mindoro. June 4, 1908. Length 160 mm.

4738. Maricaban Island, Luzon. January 20, 1908. Length 160 mm.

6592, 6596. Maricaban Island near Sepoc Point. July 21, 1908. Length 159 to 170 mm.

1055, 5561 to 5563. Masbate Reef, Masbate. April 20, 1908. Length 81 to 146 mm.

6240, 6280. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 127 to 147 mm.

8066. Mompog Island. March 3, 1909. Length 145 mm.

652, 3594. Pagapas Bay. February 20, 1909. Length 130 to 145 mm.

11263. Refugio Island, Pasacao. March 9, 1909. Length 138 mm.

8018. Port Banalacan, Marinduque. February 23, 1909. Length 140 mm. Two examples.

503. Port Ciego, Balabac. January 3, 1909. Length 100 mm.

8778. Quinalasag Island. June 12, 1909. Length 146 mm.

8977. Rapurapu Island and Strait. June 22, 1909. Length 145 mm.

670. Taganak. January 7, 1909. Length 140 mm.

A566 to A568. Tutu Bay, south Jolo. September 19, 1909. Length 175 to 188 mm.

6642, 6649 to 6651. Varadero Bay, Mindoro. July 23, 1908. Length 152 to 158 mm.

A1442. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 160 mm.

A1323. Tifu Bay. December 10, 1909. Length 146 mm.

84193 U.S.N.M. Cebu, Philippines. Dr. F. Baker. Length 94 mm. As *Chaetodon chrysozonus.*

CHAETODON REINWARDTI Günther

Chaetodon reinwardti GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 23 (on CUVIER).

Chaetodon reinwardti KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 150.

Chaetodon melanotus (not SCHNEIDER) (REINWARDT) CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 71. Moluccas.

Body orbicular. Snout pointed. D. XII, 25; A. III, 13. Yellowish, with ocular band and 2 black spots on caudal, one above the other. Ventrals black, with dorsal and anal black edged, other fins yellowish. Length 102 mm. (Cuvier.)

CHAETODON MELANNOTUS Schneider

Chaetodon melannotus SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 224. Tranquebar.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar).

Chaetodon melanotus (Reinwardt) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 71 (Tranquebar).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 150 (India, Africa).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 56 (Koseir).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 44 (Samoa, Fiji).—Day, Fishes of India, pt. 1, 1875, p. 108, pl. 28, fig. 1.—Klunzinger, Fische Roth. Meer, 1884, p. 777.—Day, Fauna Brit. India, vol. 2, 1889, p. 9.—Weber, Siboga Exp., vol. 57, Fische 1913, p. 307 (Elat and Feer).—McCulloch, Rec. Austral. Mus., vol. 14, No. 1, 1923, p. 3 (Murray Island, Queensland).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 128 (Indian Ocean, Red Sea, Mauritius, Mozambique, Samoa, Mikindani, Ralum, New Guinea, Bougainville, Palau, Carolines).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 44, pl. 11, fig. 2 (Mariveles, Batangas, Calapan, Tagapula, Gigantangan, New Washington, Bantayan, Cebu, Agutaya, Quiminatin, Zamboanga, Sibutu).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, October, 1927, p. 612 (Mozambique).

Chaedoton melanotus Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 419 (Batjan).

Tetragonoptrus (*Chaetodontops*) *melanotus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 43, pl. (14) 376, fig. 1 (Batu, Celebes, Flores, Timor, Ternate, Ceram, Amboina, Goram, Banda).

Chaetodon dorsalis (Reinwardt) Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 41, pl. 9, fig. 2. Mohila, Red Sea.—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 70 (Moluccas, Mohila).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 28 (Amboina, Fiji).—Playfair, Fishes of Zanzibar, 1866, p. 34 (Zanzibar).

Chaetodon marginatus (Ehrenberg) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 57. Massauah, Red Sea.—Rüppell, Neue Wirbelthiere, Fische, 1835, p. 28.

Chaetodon abhortani Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 58. Mauritius.

Depth 1⅗ to 1⅔; head 2⅔ to 3¼, width 2 to 2½. Snout 2⅞ to 3⅛ measured from snout tip; eye 2⅔ to 3½, greater than snout to 1⅛ with age, greater than interorbital to 1⅕ with age; maxillary reaches half way to ⅔ in snout, 4 to 5 in head; interorbital 3 to 3⅔, broadly convex. Gill rakers 3+9, short weak points, ⅛ of gill filaments, which 1⅓ in eye.

Scales 22 to 28 between gill opening and caudal base; tubes in lateral line 25 or 26; 7 or 8 scales above lateral line, 13 to 16 below. Scales with 10 basal radiating striae; apical denticles 55 to 116, with 5 to 23 transverse series of basal elements; circuli very fine.

D. XII, 19, I or 20, I, last spine 1⅗ to 1⅔ in total head length, ninth ray 1⅖ to 1½; A. III, 17, I or 18, I; third spine 1⅖ to 1½, eighth ray 1⅖ to 1⅔; least depth of caudal peduncle 3 to 4; caudal truncate to slightly convex behind, 1⅓ to 1⅖; pectoral 1⅛ to 1⅖; ventral 1 to 1¼.

Back brown, lower surface pale to whitish. Each row of body scales with dark brown stripe medially, usually made up of spots, large and conspicuous or blackish at dorsal and anal bases, smaller on breast and abdomen. Two pale blotches on back, usually along summit of lateral line; anterior always larger and little larger than orbit; position often variable as anterior may fall below lateral line. Pale band little curved down, defines dark color of back from that of lower side and placed slightly above median axis. Black ocular band, wide as pupil, extends from occiput, usually meets its fellow as small blotch at chest, and bordered in front and behind by narrow pale line. Iris otherwise pale or yellowish. Black band on caudal peduncle variable as two black blotches or single one. Fins all pale brownish, borders of soft dorsal narrowly whitish with submarginal dark brown line. Caudal with terminal half whitish, separated from brown basal tint by narrow deep brown transversely.

Red Sea, Zanzibar, Mauritius, India, East Indies, China, Queensland, Melanesia, Polynesia. The young are similar to the adults in coloration, the black blotches on the caudal peduncle perhaps larger and occellate.

790 and 791. Agojo Point, Catanduanes Island. June 10, 1909. Length 99 to 110 mm.

1280. Alimango Bay. March 5, 1909. Length 82 mm.

329. Atulayan Island. June 18, 1909. Length 120 mm.

848. Baganga Bay. May 13, 1908. Length 127 mm.

755. Buang Bay, Talajit Island. March 15, 1909. Length 134 mm.

15307. Busin Harbor, Burias Island. March 8, 1909. Length 86 mm.

922, 973. Busin Harbor, Burias Island. April 22, 1908. Length 92 to 97 mm.

865, 866, 872. Busin Harbor. April 23, 1908. Length 61 to 93 mm.

438. Butauanan Island. June 13, 1909. Length 110 mm.

1272, 1273. Cabugan Island, Hinunangan. July 30, 1909. Length 130 to 143 mm.

267. Cagayanes Island. March 31, 1909. Length 143 mm.

775, 1262, 4615. Calangaman Island. March 16, 1909. Length 125 to 134 mm. [1375].

1243. Candaraman Island. January 4, 1909. Length 82 mm.

713. Caracaran, Batan Island. June 8, 1909. Length 115 mm.

506. Casogoran, Malhon Island. July 27, 1909. Length 71 mm.

7971. Catbalogan, Samar Island. April 16, 1908. Length 111 mm.

3902. Cebu market. April 4, 1908. Length 110 mm.

726, 939 to 941. Cebu market. April 5, 1908. Length 107 to 121 mm.

395, 396. Dalaganem Island. April 8, 1909. Length 125 to 126 mm.

1221, 4870. Galera Bay, Mindoro. June 9, 1908. Length 102 to 144 mm.

1059, 1060. Ligpo Point. January 1, 1908. Length 131 to 136 mm.

4694, 4695, 4697, 4698, 22233. Little Santa Cruz Island. May 26, 1908. Length 90 to 150 mm.

1118, 4882. Little Santa Cruz Island. May 28, 1908. Length 105 to 110 mm.

1255, 1256. Maagnas, Lagonoy Gulf. June 17, 1909. Length 92 to 116 mm.

1126, 1127. Mactan Cove. April 6, 1908. Length 100 to 120 mm.

24, 370, 371. Malapascua Island. March 16, 1909. Length 94 to 128 mm.

579. Matnog Bay. May 31, 1909. Length 100 mm.

717, 1683. Near Palag Bay. June 16, 1909. Length 135 mm.

701. Pagapas Bay. February 20, 1909. Length 95 mm.

730. Port Galera. June 9, 1908. Length 105 mm.

406. Port Palapag. June 3, 1909. Length 75 mm.

18978. Quinalasag Island, Masamat. June 12, 1909. Length 112 mm.

12586. Rapurapu Island. June 22, 1909. Length 110 mm.
4769, 4770. Sablayan, Mindoro. December 12, 1908. Length 127 to 143 mm.
9678 [119]. Siasi Island market. February 17, 1908. Length 92 mm.
1177. Santa Cruz Island. April 24, 1908. Length 123 mm.
595, 596. Silino Island. August 10, 1909. Length 127 to 138 mm.
196. Simaluc Island. September 22, 1909. Length 136 mm.
570. Surigao, Mindanao. May 8, 1908. Length 110 mm
642, 796, 19437. Taganak Island. January 7, 1909. Length 123 to 140 mm.
899. Tapiantana. September 13, 1909. Length 125 mm.
3880. Tara Island. December 14, 1908. Length 140 mm.
587, 805 [807]. Tara Island. December 15, 1908. Length 130 to 132 mm.
10374. Tilig, Lubang Island. July 15, 1908. Length 106 mm.
1065 to 1070. Tumindao Island, southern Luzon. February 26, 1908. Length 88 to 127 mm.
667. Ulugan Bay. December 29, 1908. Length 100 mm.
One example. Varadero Harbor. July 22, 1908. Length 165 mm. Also two small examples in Tholichthys stage, 18 to 22 mm.
6946. West Coast of Sabatan Island. November 8, 1908. Length 164 mm.
557. Daisy Islet. January 6, 1910. Length 133 mm.
6. Danawan and Si Amil Islands. September 26, 1909. Length 120 mm.
Six examples. Talisse Island. November 8, 1908. Length 20 to 22 mm.
458, 484. Talisse Island. November 9, 1909. Length 110 to 135 mm.
415, 464. Togian Bay, Togian Island. November 19, 1909. Length 58 to 73 mm.
4835. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 94 mm.
9881. Gane Road, Gillolo Island. December 1, 1909. Length 37 mm.
13252. Birabirahan Island, Borneo. December 31, 1909. Length 126 mm.
22966. Reefs in Apra Bay, Guam. November 19–21, 1907. Length 109 mm.
43937 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 115 to 153 mm. Ten examples.
62313 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 85 to 130 mm. Four examples.

CHAETODON COLLARE Bloch

Chaetodon collare Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 116, pl. 216, fig. 1. Japan.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1263 (Japan).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 424 (copied).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 223 (Japan).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 460, 491 (Japan).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 53 (copied).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 135 (Japan).

Chetodon collaris Bonnaterre Tabl. Ichth., 1788, p. 86 (Japan).

Chaetodon collaris Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 21 (Japan?).—Kner, Reise Novara, Fische, 1865, p. 99 (Java).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 40 (part).—Boulenger, Proc. Zool. Soc. London, 1887, p. 657 (Muscat, Arabia).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 534, fig. 3 (Tokyo, Ikune).—Franz, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 49 (Yokohama).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912,p. 422 (Kagoshima).—Zugmayer, Abh. Bayer. Akad. Wiss., vol. 26, abth. 6, 1913, p. 11 (Oman).—Seale, Philippine Journ. Sci., vol. 9, 1914, p. 72 (Hong Kong).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 41 (Calapan).

Citharoedus collaris Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 144.

Tetragonoptrus collaris Bleeker, Nederl. Tijds. Dierk., vol. 4, 1873, p. 140 (China).

Tetragonoptrus (*Chaetodontops*) *collaris* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 42, pl. (11) 373, fig. 2 (Sumatra, Nias, Pinang, Java, Celebes).

Chaetodon aureus (not Bloch) Schlegel, Fauna Japonica, Poiss., dec. 5–6, 1844, p. 81, pl. 42, fig. 1 (Nagasaki).—Richardson, Ichth. China Japan, 1846, p. 246 (copied).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 29 (copied).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Canton).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Toyko, 1897, p. 52.—Seale, Philippine Journ. Sci., vol. 9, 1914, p. 71 (Hong Kong).

Chaetodon viridis Bleeker, Nat. Gen. Arch. Nederland. Indië, vol. 2, 1845, p. 520. Batavia.

Chaetodon praetextatus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 8, pt. 2, 1849 (1850) p. 156, pl. 3. Pinang.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 22 (types).—Day, Fishes of Malabar, 1866, p. 31.—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 356 (Formosa).

Chaetodon unifasciatus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 69. Indian Ocean.

Chaetodon parallelus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 70. Indian Ocean.

Chaetodon auripes Jordan and Snyder, Annot. Zool. Japan, 1900, p. 90 (on Schlegel).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 133 (Japan, Yedo).

Chaetodon collare var. *duplicollis* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 135. India.

Chaetodon collare var. *duplicicollis* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 137. India.

Chaetodon collare var. *knerii* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 135. Java and Hong Kong.

Chaetodon lunula (part) Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 422 (Misaki, Tanegashima).

Depth 1⅓ to 1⅖; head 3⅛ to 2⅞, width 2 to 2⅛. Snout 2⅞ to 3 in head; eye 3 to 3⅗, 1⅛ to 1⅙ in snout, 1 to 1⅛ in interorbital; maxillary ⅔ to ¾ in snout, 3⅔ to 4 in head; interorbital 3¼ to 3⅔, broadly convex. Gill rakers 4+13, short points, 3⅓ in gill filaments, which 1½ in eye.

Scales 40 or 41 between gill opening and caudal base; tubes 36 to 38 in lateral line; 9 or 10 scales above lateral line, 15 or 16 below. Scales with 8 to 11 basal radiating striae, and 1 to 6 auxiliaries incomplete; apical denticles 123 to 160, with 12 to 22 series of transverse basal elements; circuli very fine.

D. XII, 22, I or 23, I, fourth spine 2 to 2⅓ in head, fourth ray 1⅓ to 1⅘; A. III, 17, I to 19, I, third spine 2 to 2⅛, fourth ray 1⅖ to 1½; least depth of caudal peduncle 2⅞ to 3⅒; caudal truncate, slightly convex as expanded, 1¼ to 1⅓; pectoral 1 to 1⅛; ventral 1⅛ to 1⅓.

Brown, breast and abdomen below paler. Above lateral line 5 darker bands, parallel with its course, below 13 or 14 horizontal, each extending medially on scale row. Broad blackish-brown band from predorsal, meeting its fellow and including most of eye and down across cheek to edge of gill opening, but not on chest; broad white band all along posterior border and narrow white band along front border below eye. Lips deep brown. Iris dark brown. Vertical fins dark brown like back; soft dorsal and anal each with pale to whitish submarginal line; caudal broadly pale behind, inner half of band yellowish. Paired fins dull brown.

Red Sea, India, East Indies, Formosa, China, Japan.

7104 and 7105. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 167 to 173 mm.

6910. Santo Domingo, Batan. November 7, 1908. Length 174 mm.

7183. West coast of Palaui Island. November 18, 1908. Length 170 mm.

6936 to 6939, 6948, 6968 to 6970. West coast of Sabtan Island. Length 163 to 173 mm.

674, 4816, A1591, A1592. Hokuko, Soo Wan, Formosa. January 29, 1910. Length 148 to 157 mm.

A1561, A1566, A1567. San Wan, Kwa Siang Bay, Formosa. January 25, 1910. Length 163 to 175 mm.

22585 U.S.N.M. Sagami, Japan. Japanese Government. Length 135 mm.

50427 U.S.N.M. Hong Kong, China. P. L. Jouy. Length 139 mm.

71290 U.S.N.M. Misaki, Sagami, Japan. *Albatross* collection, 1906. Length 42 mm. As *Chaetodon lunula*.

71487 U.S.N.M. Tanegashima. *Albatross* collection. Length 48 to 67 mm. Two examples. As *Chaetodon lunula*.

72112 U.S.N.M. Kagoshima, Satsuma. Bureau of Fisheries. Length 113 to 145 mm. Two examples.

CHAETODON RETICULATUS Cuvier

Chaetodon reticulatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 32, pl. 171. Tahiti and Ulea.—Lesson, Voy. Coquille, Zool., vol. 2 (1), 1830 (1831), p. 178, pl. 30, fig. 2 (Tahiti).—Swainson, Nat. Hist. Animals, vol. 2, 1839, p. 211.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 22 (copied).—Kner, Reise Novara, Fische, 1865, p. 271 (Tahiti).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 486 (copied).—Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 342 (Apia and Pago Pago).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 139 (Samoa and Jaluit).

? *Chaetodon bellicosus* Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 383. Guam. (No description, passing reference.)

Chaetodon superbus (Broussonet) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 32. Ulea. (Name in text.)

Citharoedus collaris (not Bloch) Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 141 (Tahiti).

Chaetodon collaris Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 40, pl. 31, fig. A (Paumotu).—Fowler, Occas. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 384 (Honolulu); Bishop Mus. Bull., No. 22, 1925, p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Wake Island).

Depth 1⅓ to 1⅖; head 2⅔ to 3⅕, width 1⅞ to 2. Snout 2⅖ to 3 in head from snout tip; eye 3 to 3⅗, 1 to 1⅕ in snout, little greater than interorbital in young to 1½ in interorbital with age; maxillary to nostrils, to front eye edge with age, 3⅕ to 3¼ in head; interorbital 3 to 3⅛, broadly convex. Gill rakers 3+18, short, ⅙ of gill filaments, which 1⅕ in eye.

Scales 38 to 42 between gill opening and caudal base; tubes 35 to 38 in lateral line; 8 or 9 scales above lateral line, 21 to 24 below. Scales with 12 or 13 basal radiating striae; apical denticles 61 to 101, with 5 to 7 transverse series of basal elements; circuli fine.

D. XII or XIII, 27, I or 28, I, fourth spine 1⅔ to 2 in head, fourth ray 1⅘ to 2; A. III, 21, I to 25, I, third spine 1⅗ to 2, fifth ray 1⅖ to 1½; least depth of caudal peduncle 2½ to 3; caudal little convex behind, 1⅓ to 1⅖; pectoral 1 to 1⅖; ventral 1 to 1⅛.

Broad pale brown band vertically from posterior predorsal region and front of spinous dorsal down till close above ventral base, embraces also all of postocular region, humeral region and pectoral base. Broad blackish band from upper interorbital, supraoccipital and front predorsal down to eye, then over cheek below including all of lower preventral region or lower face of chest; band bordered largely in front and behind by contrasted yellow line, latter strongly delimiting dark muzzle and invading front edge of iris. Interorbital olive; snout and chin largely dusky, though lips brownish. Scales on most of trunk and tail largely black, each with median pale to yellow spot, which on scales of back much larger. Soft dorsal brownish, margin broadly pale to whitish, with narrow submarginal dusky line. Anal largely blackish, margin broadly whitish, lower edge with black submarginal band superimposed. Caudal base and most of caudal peduncle, at least posteriorly, blackish, fin largely brown, broad margin behind whitish with close blackish narrow submarginal band and another divides pale border from brown median color. Pectoral olivaceous. Ventral black.

This beautiful fish shows but little change with age and is not abundant in collections. Previously only known from Oceania.

9651 [1580]. Port Palapag, near northern Samar. June 3, 1909. Length 100 mm. Yellows on head and breast show sulphur after short immersion in alcohol, also spots on lower portion of body and yellows of dorsal and caudal. Pale bar across entire body and head posteriorly not so defined above but merging into pale yellow or gray of dorsal medially. Dorsal spines very pale sulphur. Extreme margin of soft dorsal reaches about half way down opercle edge, narrowly white on black line, then broader sulphur band. Third sulphur bar crossing front of cheek continued across front of eye. Lips somewhat pale. Anal edge white, not passing along vertical edge except at rounded point, this on black band divided medianly by obscure sulphur streak, orange on lower vertical edge, but no small spots on anal base and caudal peduncle posteriorly. Tip of caudal hyaline, gray central band broad, reaches almost to base.

5225 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Four examples. Length 64 to 147 mm.

CHAETODON SELENE Bleeker

Chaetodon selene Bleeker, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 76. Lawajong, Solor.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 30 (Amboina).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Yokohama).—Boulenger, Proc. Zool. Soc. London, 1887, p. 657 (Muscat, East Arabia).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 96 (Bulan).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 11 (Oman).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 119 (no locality).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 54, pl. 10, fig. 1 (Puerto Galera, Bulalacao Bay).

Tetragonoptrus (*Chaetodontops*) *selene* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 44, pl. (15) 377, fig. 5 (Celebes, Solor, Amboina).

Depth 1⅗ to 1¾; head 2¾ to 3, width 2¼ to 2⅖. Snout 2¼ to 2⅓ in head from upper jaw tip; eye 3⅖ to 3½, 1⅖ to 1⅔ in snout, little greater than interorbital in young to equal to interorbital with age; maxillary ⅗ to ⅔ of snout, 3½ to 3¾ in head; interorbital 3⅘ to 4, broadly convex. Gill rakers 4 + 13, short points, ⅙ of gill filaments, which 1¼ in eye.

Scales 32 to 34 between gill opening and caudal base; tubes 28 to 30 in lateral line; 7 scales above lateral line, 13 or 14 below. Scales with 15 to 19 basal radiating striae; apical denticles 115 to 160, with 10 to 17 transverse series of basal elements; circuli fine.

D. XII, 20, i or 21, i, fourth spine 2 to 2⅓ in total head length, fourth ray 1¾ to 1⅘; A. III, 18, i or 19, i, third spine 1¾ to 2, fourth ray 1⅔ to 1⅘; least depth of caudal peduncle 3 to 3⅕; caudal with hind edge slightly lunate or emarginate, 1⅕ to 1½; pectoral 1⅓ to 1⅖; ventral 1⅖ to 1⅔.

Largely pale or yellowish brown, each scale above lateral line before its arch with small, pale, median spot. Brown band, narrow at first, along base of spinous dorsal and soft dorsal, when broader across tail and front of caudal peduncle down along soft anal base, where narrowing. Below lateral line each scale with narrow slightly darker line following in median course of scale rows. Brown band from predorsal down to eye with pale bordering line in front and behind; below eye pale band across cheek, narrowing below. Broadly pale diffuse interocular band. Soft dorsal and anal each with broad pale edge and submarginal dark line. Caudal broadly whitish behind, inner edge with brown line next to pale diffuse streak which little more arched.

East Indies, Philippines. Bleeker had 9 specimens from 3 localities, the largest 160 mm. The species is quite constant and shows but slight variation.

A506. Balukbaluk Island. September 12, 1909. Length 153 mm. General color of side silvery gray, slight olivaceous shade above and somewhat lavender below, without yellow shown in Bleeker's plate. Ocular band blackish above, broadly bordered with orange behind running broadly into nape; below edge yellow narrower than above, ending at edge of cheek or obscurely running across interopercle, probably dusky in life. Two narrow interocular bars orange and stripe of same along forehead to eye on either side some distance before ocular bar; broader stripe through nostrils with dash on premaxillary below its end. Opercular flap orange. Sides of body crossed obliquely by upward curved bars, first 4 not including few spots along upper edge of ocular bar on shoulder formed of round orange dots, 1 on each scale and ¼ or less of pupil diameter; below angle of gill opening stripes pale purplish, 3 with origin above pectoral base, 2 behind base, 5 between pectoral and anal bases and 1 behind anal; stripes broken above and posteriorly into round dots of same color, 1 on each scale, but not quite regular and ⅓ to ½ of pupil diameter. Broad yellow stripe medially on ventral surface, begins shortly behind ventrals and merges with color of anal fin. Dorsal base with black bar, rather obscured by general yellow color anteriorly on spinous portion, becomes distinct posteriorly extending downward into scaled portion of body, crosses caudal peduncle and extends along about ⅖ posterior anal base; within an orange bar, more narrow; spines above scaled region cadmium orange, incised portions of membranes yellow; from fifth or sixth spine upper scaled part cadmium orange, color expanding broadly on soft fin to include all except narrow yellow edge, continuation of spinous membrane color which rests on gray and black line, latter not extending down all of vertical edge. Anal like dorsal but basal half of soft fin posteriorly yellow instead of orange. Caudal peduncle yellow behind dusky, base of caudal orange, terminal part of fin dusky hyaline with very narrow yellow tip in fork and yellow crescent extending down from tip of each lobe through outer portion of orange. Pectoral dusky hyaline. Ventral pale orange on lower surface, white above, spine orange.

727, 937, 938. Cebu market. April 5, 1908. Length 114 to 134 mm.
451. Doc Can Island. January 7, 1910. Length 153 mm. [2183].
366, 367. Malapascua Island. March 16, 1909. Length 120 to 145 mm. [1368].
4724. Pilas Island. September 12, 1909. Length 123 mm.
19552. Singaan Island. September 21, 1909. Length 107 mm.
55944 U.S.N.M. Bulan, Philippines. Bureau of Fisheries. Length 125 mm. [4342].

CHAETODON OCELLICAUDA Cuvier

Chaetodon ocellicaudus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 69. No locality (Voyage de Peron).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 150.

Chaetodon ocellicauda Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 29 (Indian Ocean).—Playfair, Fishes of Zanzibar, 1865, p. 35 (Zanzibar).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Schmeltz, Mus. Godeffroy Cat., vol. 6, 1877, p. 13 (Red Sea).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Siao, Sangi; Ternate).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 486 (Luzon, Cavite).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 131 (Matupi? Ralum, Amboina, New Guinea).

Body with darker streaks, descending obliquely forward. Ocular band much narrower than eye, reaches from dorsal origin till across chest. Large black, white edged spot on each side of tail, occupying its whole length. Dorsal and anal with whitish edge. Caudal with narrow blackish streak across middle. Ventral white. (Günther.)

CHAETODON NIGROPUNCTATUS Sauvage

Chaetodon (*Tetragonoptrus*) *nigropunctatus* SAUVAGE, Bull. Soc. Philomath. Paris, 1880, p. 222. Mascate.

Choetodon (*Tetragonoptrus*) *nigropunctatus* SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 257, pl. 29, fig. 2 (type).

Chaetodon obscurus BOULENGER, Proc. Zool. Soc. London, 1887, p. 657. Muscat.

Upper profile of head concave. Snout larger than eye. Preopercle not denticulate. Scales 38 in lateral line, 5 above, 17 or 18 below. D. XIII, 22; A. III, 18; soft dorsal and anal angular, caudal truncate. Dark brown, each scale with blackish center. Dorsal and anal spines, edges of soft dorsal and anal and ventral blackish. Caudal black, with broad yellow edge. Length 140 mm. (Boulenger.)

CHAETODON DAYI Ahl

Chaetodon dayi AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 127 (on *Chaetodon* DAY, Fishes of India, pt. 1, 1875, p. 109.—JERDON, Madras Journ. Lit. Sci., 1851, p. 134. Telicherry).

D. XIV, 26; A. III, 23. Lavender. Line from first dorsal to muzzle yellow. Chin, throat and lower part of face and line from top of opercle to pectoral base orange. Spinous dorsal membranes yellow. Blue spot continues in line to upper part of soft dorsal and also on anal. Soft dorsal green with yellowish edge. Anal and ventral yellow. Caudal lavender, rays purple, margined on sides with yellow and exteriorly with orange. Lips red. Length 152 mm. (Jerdon.)

A doubtful species, likely near *Chaetodon nigropunctatus*.

CHAETODON DAHLI Ahl

Chaetodon dahli AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 143, pl. 1, fig. 3. Ralum, Bismark Archipelago.

Body rounded. Snout pointed. Eye greater than snout. Preopercle weakly denticulate. Scales 32 laterally, 5 above, 13 below. D. XIII, 23; A. III, 19 or 20; soft vertical fins rounded. Yellowish, darker on back. Blackish brown ocular band from nape to lower edge of interopercle. Soft dorsal with dark spot. Soft dorsal and anal with submarginal dark line and each with white edge. Caudal base with black streak. Paired fins clear. Length 29 mm. (Ahl.)

CHAETODON UNIMACULATUS Bloch

Chaetodon unimaculatus BLOCH, Naturg. Ausl. Fische, vol. 3, 1787, p. 75, pl. 201, fig. 1. East Indian Collection.—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1258 (India).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 439 (on BLOCH).—FORSTER, Fauna Indica, 1795, p. 15.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 221 (East Indies).—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 72 (Tahiti).—VALENCIENNES, Règne Animal Cuvier, Poiss., Ill., 1839, pl. 39, fig. 3.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 11 (Amboina).—GUICHENOT, Mém. Soc. Hist. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 145 (Madagascar).—PLAYFAIR, Fishes of Zanzibar, 1866,

p. 32 (Zanzibar).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 37 (Bonham Island, Tahiti, Samoa).—Day, Fishes of India, pt. 1, 1875, p. 107 (Ceylon).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Day, Fauna Brit. India, vol. 2, 1889, p. 7.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Manila, Cavite).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 97 (Bacon).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 140 (type).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam), p. 27 (Hawaii), p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sept., 1927, p. 61, pl. 11, fig. 1 (Santo Domingo de Basco, Mariveles, Batangas, Tagapula, New Washington, Simara, Quiminatin, Jolo, Sitanki).

Chetodon unimaculatus Bonnaterre, Tabl. Ichth., 1788, p. 88, pl. 94, fig. 387 (Japan).

Citharoedus unimaculatus Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 145.

Tetragonoptrus (*Lepidochaetodon*) *unimaculatus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 45, pl. (13) 375, fig. 5 (Java, Solor, Timor, Ternate, Buru, Amboina, Ceram, Banda).

Chaetodon occllatus (Parkinson) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 75. Tahiti (name in text).

Chaetodon cordiformis Thiollière, Fauna Woodlark, 1857, p. 165. Woodlark Island.

Chaetodon sphenospilus Jenkins, Bull. Bur. Fish., vol. 19, 1899 (1901), p. 395, fig. 8. Honolulu.

Chactodon unimaculatus subsp. *interruptus* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 142. Mauritius.

Depth 1⅖ to 1½; head 3 to 3⅓, width 1⅘ to 2. Snout 2½ to 3 in head from snout tip; eye 2½ to 4⅛, little greater than snout in young to 1⅓ with age, greater than interorbital in young to 1⅔ with age; maxillary ½ to ⅗ in snout, 3⅖ to 3¾ in head; interorbital 2⅖ to 3½, broadly convex. Gill rakers 5 + 12, short points, ⅙ of gill filaments, which 1⅕ in eye.

Scales 36 to 38 between gill opening and caudal base; tubes 32 to 35 in lateral line; 7 to 9 scales above lateral line, 24 or 25 below. Scales with 14 or 15 basal radiating striae; apical denticles 63 to 156, with 3 to 22 transverse series of basal elements; circuli fine.

D. XIII, 22, I or 23, I, last spine 1⅖ to 2 in total head length, fifth ray 1⅖ to 1½; A. III, 19, I or 20, I, third spine 1⅖ to 1⅛, fifth ray 1⅓ to 1⅔; least depth of caudal peduncle 3 to 3⅛; caudal 1⅖ to 1½, hind edge slightly convex; pectoral 1 to 1⅙; ventral 1⅛ to 1⅕.

Light brown generally. Broad black band from predorsal and supraoccipital to eye and below on side of breast meeting its fellow. On back medianly black rounded blotch, larger than eye with age or extends over 8 scales. Posterior borders of soft dorsal and anal black, edges very narrowly white. Fins otherwise all uniformly pale brown like body.

Zanzibar, Madagascar, Ceylon, East Indies, Polynesia, Hawaii. In young examples the black blotch on the back is smaller than in the adults and with a broad white border.

8949. Between Paron and Jesus Points, Albay Gulf, Luzon. June 21, 1909. Length 148 mm.
781, 782, 1181 [1537]. Bolinao Island. March 10, 1909. Length 137 to 145 mm.
3925 [1005]. Caxisigan Island, off Balabac. January 2, 1909. Length 144 mm. Like Bleeker's figure, except lower part of side and belly almost pure white, back and upper portions more pure lemon yellow than shown. Ocular bands, peduncular bars and lateral blotch jet black. Caudal and pectoral dusky. Ventral cadmium.
249 [1012]. Caxisigan Island. December 29, 1909. Length 75 mm.
21586. Guiniyan Island. June 4, 1909. Length 122 mm.
653, 9020. Langao Point, Luzon. June 24, 1909. Length 150 to 165 mm.
1257. Maagnas, Lagonoy Gulf. June 17, 1909. Length 131 mm.
20296. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 120 mm.
399. Paron Point, Albay Gulf. January 21, 1909. Length 130 mm.
852, 853. Port Matalvi, Luzon. November 22, 1908. Length 130 to 137 mm.
986, 987, 9429. Port Matalvi. November 23, 1908. Length 124 to 127 mm.
403. Port Palapag. June 3, 1909. Length 84 mm.
215 to 218. Rapu Rapu Island. June 22, 1909. Length 113 to 123 mm.
1041 to 1044. Sabtan Island. November 8, 1908. Length 94 to 103 mm.
6907. Santo Domingo, Batan. November 7, 1908. Length 145 mm.
A513, 19231. Tapiantana Island. September 13, 1909. Length 95 to 152 mm.
6990. West coast of Sabtan Island. November 9, 1908. Length 129 mm. Side below silvery. Back and dorsal sulphur yellow. Ocular and caudal bars black, also lateral blotch. No lateral stripe apparent over pectoral. Caudal base white, fin almost hyaline. Anal and ventral bright cadmium.
A721. Danawan Island. September 27, 1909. Length 137 mm.
A1078. Maitara Island. November 26, 1909. Length 165 mm.
A752. Sipadan Island. September 28, 1909. Length 153 mm.
9649. Tomahu Island. December 11, 1909. Length 48 mm.
4731. Gane Road, Gillolo Island. December 1, 1909. Length 61 mm.
A861. Limbe Strait, Celebes. November 10, 1909. Length 165 mm.
3898. Tidore Island, south of Ternate. November 25, 1909. Length 85 mm.
4686, 4690. Apra Bay, Guam. November 19–20, 1907. Length 93 to 132 mm.
43931 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 93 mm.
49700 and 50704 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Type of *Chaetodon sphenospilus.*
51153 U.S.N.M. Hawaii. Bureau of Fisheries.
52324 U.S.N.M. Apia, Samoa. Bureau of Fisheries, 1902. Length 108 to 125 mm. Four examples.
55112 U.S.N.M. Honolulu. E. L. Berndt. Length 82 to 145 mm. Five examples.
55480 U.S.N.M. Honolulu. Fur Seal Commission. Length 140 mm. [562].
55960 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 100 mm. [3342].
58533 U.S.N.M. Honolulu. E. L. Berndt. Length 114 mm.

CHAETODON MELANOPOMA Playfair

Chaetodon melanopoma PLAYFAIR, Fishes of Zanzibar, 1865, p. 35, pl. 6, fig. 2. Aden.

Snout slightly produced, little longer than eye. Preopercle very indistinctly serrated. Scales 25 in lateral line. D. XII, 25; A. III, 21; soft vertical fins rounded. Yellow with darker lines nearly vertical and following series of scales. Ocular band dark blotch, extending in breadth nearly to opercle angle and in length to end of subopercle. Soft vertical fins with light margins and black submarginal lines. (Playfair.)

CHAETODON KLEINII Bloch

Chaetodon kleinii Bloch, Naturg. Ausl. Fische, vol. 4, 1790, p. 7, pl. 218, fig. 2. East Indies.—Walbaum, Arted. Pisc., vol. 3, 1792, p. 422 (on Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 225 (East Indies).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 461, 495 (Indies).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 30 (copied).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 22 (Amboina, Java, type of *Chaetodon flavescens*).—Playfair, Fishes of Zanzibar, 1866, p. 33 (Zanzibar).—Capello, Jorn. Soc. Sci. Lisboa, 1871, p. 199 (Mozambique).—Günther, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—Day, Fishes of India, pt. 1, 1875, p. 106.—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Celebes and Sangi).—Day, Fauna Brit. India, vol. 2, 1889, p. 6.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 486 (Luzon, Manila).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 124 (Amboina).—Weber, Siboga Exp., vol. 57, 1913, p. 305 (Karakelang, Binungka, Nusa Laut, Banda, Tuir, Postillion Islands).—McCulloch and Whitley, Mem. Queensland Mus., vol. 8, pt. 2, July 7, 1925, p. 159 (Murray Island).

Chaetodon kleini Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Manila).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Regan, Ann. Durban Mus., vol. 1, 1908, p. 169 (Natal).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 144 (type, Ralum, Amboina, Mozambique, German East Africa, Mikindani, New Britain, type of *Chaetodon melastomus*).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sept. 1927, p. 58, pl. 13, fig. 2 (Luna, Olongapo, Sisiman, Mariveles, Hamilo, Calapan, Bulalacao Bay, Gigantangan, Quiminatin, Samal, Zamboanga, Sibutu).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 614 (Natal, Mozambique).

Tetragonoptrus kleini Bleeker, Nederl. Tijds. Dierk., vol. 4, 1874, p. 117 (China).

Tetragonoptrus (*Lepidochaetodon*) *kleini* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 45, pl. (11) 373, fig. 3 (Celebes, Sangi, Flores, Solor, Timor, Halmaheira, Ternate, Batjan, Buru, Ceram, Amboina, Goram, Banda, New Guinea).

Choetodon (*Tetragonoptrus*) *kleinii* Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 258.

Chaetodon melastomus Schneider, Syst. Ichth. Bloch, 1801, p. 224. Tranquebar.

Chaetodon melanomystax Schneider, Syst. Ichth. Bloch, 1801, p. 224. No locality.

Chaetodon virescens Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 30. Timor; Mauritius.—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 25.

Chaetodon flavescens Bennett, Proc. Zool. Soc. London, vol. 1, 1831, p. 61. Mauritius.

Depth 1⅖ to 1⅗; head 3 to 3½, width 1⅘ to 2. Snout 2¾ to 2⅘ in head; eye 2¾ to 3, slightly greater than snout in young to 1¼ with age, greater than interorbital in young to equal with age; maxillary ⅗ to ¾ in snout, 3¾ to 3⅞ in head; interorbital 3⅒ to 3⅕, convex. Gill rakers 5+13, short points, about ⅛ of gill filaments, which 1½ in eye.

Scales 30 or 31 between gill opening and caudal base; tubes 32 to 34 in lateral line; 7 or 8 scales above lateral line, 14 or 15 below. Scales with 14 or 15 basal radiating striae, also 1 to 3 auxiliaries; apical denticles 70 to 160, with 3 to 5 series of basal elements transversely; circuli fine.

D. XIII, 23, i, last spine 1¼ to 1⅓ in head, eighth ray 1⅕ to 1¼; A. III, 17, i or 18, i, third spine 1⅖ to 1⅘, eighth ray 1⅖ to 1½; least depth of caudal peduncle 2⅞ to 3⅛; caudal 1⅓ to 1⅖, hind edge slightly convex; pectoral 1⅛ to 1⅒; ventral 1 to 1⅛.

Generally pale brown, lighter or paler below. From predorsal blackish-brown band, meeting its fellow extends down to eye, over cheek and side of breast where it also joins its fellow, though width much less than eye-diameter. Lips and end of muzzle dusky. Diffuse pale band extends from front dorsal spines down to include pectoral base, also to ventral base. Another diffuse pale broader band-like area from middle of back down to post-ventral region. Some examples with spinous dorsal dusky terminally or marginally. Soft dorsal and anal each narrowly edged whitish, with very narrow dusky to blackish submarginal line. Caudal pale with broad gray to gray-brown posterior border. Pectoral pale brown. Ventral blackish, spine pale brown.

Zanzibar, Mozambique, Mauritius, Reunion, India, East Indies, China, Queensland, Melanesia, Micronesia. One example (969) has the caudal rudimentary, evidently atrophied from an injury.

623, 9680. Bagacay Bay, Escarpada Island. March 13, 1909. Length 94 to 113 mm.
502. Biri Channel. June 2, 1909. Length 105 mm.
756. Buang Bay, Talajit Island. March 15, 1909. Length 110 mm.
621. Bugsuk Island. January 5, 1909. Length 78 mm.
265. Cagayanes Island. March 31, 1909. Length 110 mm.
1238, 1239. Candaraman Island. January 4, 1909. Length 79 to 80 mm.
12261. Caxisigan Island. January 2, 1909. Length 76 mm.
942. Cebu market. April 5, 1908. Length 102 mm.
10423. East of Verde Island. July 22, 1908. Length 92 mm.
487, 1212 to 1217. Galera Bay. June 9, 1908. Length 91 to 112 mm.
516 to 518. Gubat Bay, Luzon. June 23, 1909. Length 86 to 96 mm.
22938. Inamucan Bay, Mindanao. August 9, 1909. Length 100 mm.
2027, 2028. Jolo Island. February 16, 1908. Length 67 to 79 mm. (D. 5147.)
430, 801, 802, 955, 960, 22057, 22058. Langao Point, Luzon. June 24, 1909. Length 77 to 98 mm.
1105 to 1110, 4878, 4884, 4885. Little Santa Cruz Island. May 28, 1908. Length 104 to 120 mm.

645. Lode Bay, Destacado Island. March 13, 1909. Length 100 mm.

953, 954. Malanipa Island. September 8, 1909. Length 113 to 117 mm.

9054. Maricaban Island. January 20, 1908. Length 97 mm.

606, 607, 613, 1227. Murcielagos Bay. August 4, 1909. Length 77 to 93 mm.

389. Near Palag Bay, Luzon. June 16, 1909. Length 91 mm.

4758, 4759, 10406 to 10408. Northwest of Verde Island. July 22, 1908. Length 75 to 113 mm.

4745, 21016, 21017. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 89 to 102 mm.

4743. Pilas Island. September 12, 1909. Length 89 mm.

703 to 706, 887. Port Galera. June 9, 1908. Length 58 to 120 mm.

7977 and 9648. Port Galera, Mindoro. October 27, 1909. Length 102 to 112 mm.

969, 10299, 10477, 10493, 11024, 22740. Port Maricaban. July 21, 1908. Length 56 to 113 mm.

721. Port Palapag. June 3, 1909. Length 83 mm.

3920. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 84 mm.

934. Pujada Bay. May 15, 1908. Length 85 mm.

1126 and 11262. Refugio Island, Pasacao. March 9, 1909. Length 124 to 129 mm.

597 and 598, 4776. Silino Island. August 10, 1909. Length 112 to 120 mm.

4771. Simonor Island. February 24, 1908. Length 106 mm.

4772. Simonor Island. February 26, 1908. Length 88 mm.

A448. Sitanki wharf. February 26, 1908. Length 108 mm.

19229. Tapiantana Island. September 13, 1909. Length 194 mm.

490 to 496, 283. Tataan, Tawi Tawi. February 21, 1908. Length 88 to 110 mm. Yellowish olive on vertical band covering area from second dorsal across opercle and including pectoral base to ventral; another similar area before middle of side, posterior half ochraceous, alternating and between lighter dusky areas; center of each scale with gray spot, forming indefinite lines curving down. Ocular band little narrower than eye, purplish black above and reaching first dorsal spine; below eye seal brown; joins on middle of breast and continued to include ventral base. Interorbital region lighter than ocular band and snout tip dark purplish. Dorsal body color, shading to dusky lemon yellow on edge of soft fin; entire edge of soft fin narrowly edged with white and submarginal black line. Anal ochraceous, margined as soft dorsal, front of spines and vent dusky. Caudal bright lemon yellow, tip margined with dusky hyaline about width of pupil. Caudal peduncle posteriorly with whitish bar. Pectoral dusky hyaline. Ventral slaty.

1023, 3637. Teomabal Island. September 18, 1909. Length 88 to 93 mm.

1007, 7967, 9677. Danawan and Si Amil Islands. September 27, 1909. Length 65 to 97 mm.

452, 468. Doc Can Island. January 7, 1910. Length 105 to 115 mm.

9642. Gomomo Island. December 3, 1909. Length 84 mm.

9878, 9879, 21447. Maitara Island. November 26, 1909. Length 57 to 115 mm.

14406. Talisse Island. November 9, 1909. Length 81 mm.

7981. Uki, Bouro Island, Dutch East Indies. December 9, 1909. Length 114 mm.

21123. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 48 mm.

4739. Limbe Strait, Celebes. November 10, 1909. Length 106 mm.

4836. Tidore Island, south of Ternate. November 25, 1909. Length 75 mm.

43933 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 94 to 115 mm. Three examples.

45090 U.S.N.M. Samoa. S. G. Whitmee. Length 86 to 95 mm. Two examples.

65790 U.S.N.M. Jaluit, Marshall Islands. *Albatross* collection. Length 85 to 106 mm. Five examples.

CHAETODON AURIGA Forskål

Chaetodon auriga Forskål, Descript. Animal., 1775, pp. xii, 60. Djedda and Lohaja, Red Sea.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1266 (Arabia).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 422 (copied).—Schneider, Syst. Ichth. Bloch, 1801, p. 226 (Arabia).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 457, 484 (Arabia).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 79 (Massaua).—Rüppell, Neue Wirbelthiere, Fische, 1835, p. 28 (Red Sea).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 7 (Red Sea).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 156 (Africa, Moluccas).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 776 (Koseir, Red Sea).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Day, Fishes of India, pt. 1, 1875, p. 106; Fauna Brit. India, vol. 2, 1889, p. 5.—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 96 (Bacon).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 124 (Sorong, New Guinea).—Weber, Siboga Exp., vol. 57, 1913, p. 303 (Salibabu, Saleyer, Banda, Tual, Rotti).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).—Ahl, Archiv. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 147 (Indian Ocean, Hawaii, Havai, Samoa, New Pommerania, Jaluit, Matupi? New Guinea, Amboina, Tranquebar, Radak, Tsingtau, Mauritius, Madagascar, Mozambique, Dar es Salam, Mikandi, Red Sea).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 29, pl. 7, fig. 2 (Currimao, Luna, Balavan, Mariveles, Aloneros, Batangas, Calapan, Elefante, Simara, Capul, Canigaran, San Juan, Zamboanga, Tawi Tawi).—Fowler, Proc. Acad. Nat. Sci., Phila., 1927, p. 286 (Philippines).

Chetodon auriga Bonnaterre, Tabl. Ichth., 1788, p. 90 (Red Sea).

Tetragonoptrus (*Linophora*) *auriga* Bleeker, Atlas Ichth., vol. 9, 1878, p. 47, pl. (2) 375, fig. 4 (Sumatra, Java, Cocos, Celebes, Sangi, Flores, Solor, Timor, Halmaheira, Ternate, Buru, Ceram, Amboina, Batjan, Goram, Banda); Verh. Kon. Akad. Amsterdam, vol. 18, No. 3, 1879, p. 1 (Mauritius).

Chaetodon (*Anisochaetodon*) *auriga* Klunzinger, Fische Roth. Meer., 1884, p. 56.

Chaetodon setifer Bloch, Naturg. Ausl. Fische, vol. 7, 1793, p. 101, pl. 325, fig. 1. No locality (Collection John); Naturg. Ausl. Fische, vol. 9, 1795, p. 101, pl. 425, fig. 1.—Schneider, Syst. Ichth. Bloch, 1801, p. 225 (Tranquebar).—Shaw and Nodder, Nat. Miscellany, vol. 14, 1802, pl. 551 (Indian Seas).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 76 (Mauritius, Borabora).—Lesson, Voy. Coquille, Poiss., vol. 2, pt. 1, 1830 (1831), p. 175, pl. 29, fig. 2 (Borabora).—Valenciennes, Règne Animal Cuvier, Ill. Poiss., 1839, pl. 38, fig. 1 (Mauritius).—Jenyns, Zool. Voy. Beagle, Fish., 1842, p. 61 (Keeling Islands).—Richardson, Ichth. China Japan, 1846, p. 246 (China).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 6 (Mauritius, China, Amboina, Aneiteum).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 26.—Kner, Reise Novara, Fische, 1865, p. 97 (Sydney and Paynipet Island).—Capello, Jorn. Sci. Soc. Lisboa, 1871, p. 199 (Mozambique).—Günther, Journ. Mus. Godeffroy, vol. 1, 1873, p. 36, pl. 26, fig. B (Hawaii).—Castelnau, Res. Fish. Australia (Records Phila. Expos.), 1875, p. 13 (Cape York, Queensland).—Martens, Preuss.

Exp. Ost-Asien, 1876, p. 388 (Amboina).—Günther, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p.17 (Manada, Celebes; Sioa, Sangi).—Vaillant, Nouv. Arch. Mus. Paris, vol. 3, ser. 3, 1893, p. 57 (Palawan).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Cavite, Santa Cruz).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1895, p. 53.—Jatzow and Lentz, Abh. Senckenb., Naturf. Ges., vol. 21, Heft 1, 1897, p. 502 (Zanzibar).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 531 (Nafa, Okinawa).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Regan, Ann. Durban Mus., 1908, p. 245 (Kosi Bay).—Gilchrist and Thompson, Ann. South Afric. Mus., vol. 6, pt. 2, 1908, p. 159 (Natal).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 442 (Tanegashima), p. 510 (Okinawa).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Mahambo, Madagascar).—McCulloch, Australian Zoologist, vol. 2, pt. 3, February 10, 1922, p. 91 (Iluka, New South Wales); Rec. Austral. Mus., vol. 14, pt. 1, 1923, p. 3 (Clarence River and Port Dennison, Queensland).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 11 (Guam), p. 27 (Honolulu), p. 33 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 17 (Johnston Island, French Frigate Shoals, Wake Island).—McCulloch, Rec. Austral. Mus., vol. 15, No. 1, 1926, p. 35 (Pearl Reef, Holbourne Island, Iluka, New Hebrides, Solomon Islands, Samoa, Friendly Islands, Funafuti, Papua).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 609, pl. 26, fig. 6 (Natal, Zululand, Mozambique).

Chaetodon auriga var. *setifer* Day, Fishes of India, pt. 1, 1875, p. 106, pl. 27, fig. 3 (Nicobars).

Pomacentrus filamentosus Lacépède, Hist. Nat. Poiss., vol. 4, 1803, p. 511 (on Bloch).

Chaetodon nesogallicus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 63. Mauritius.—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 154 (Bourbon).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 26.—Bleeker, Nederl. Tijds. Dierk., vol. 4, 1874, p. 117 (China).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Günther, Rep. Voy. Challenger, vol. 1, 1880, p. 27 (Botany Bay).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 485 (Luzon, Manila, Navotas).

Chaetodon sebanus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 74. East Indies, Timor, Guam, Tonga, Mauritius, Batavia.

Chaetodon lunaris Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 70. India.

Depth 1⅗ to 1⅔; head 2½ to 3, width 2⅖ to 2½. Snout 2⅓ to 2⅔ in head; eye 3 to 4¼, 1⅙ to 1⅔ in snout, little greater than interorbital to 1⅛ with age; maxillary ⅗ to ⅔ in snout, 3⅗ to 3⅘ in head; interorbital 3⅖ to 4, broadly convex. Gill rakers 4 + 14, short points ⅕ of gill filaments, which 1⅗ in eye.

Scales 29 or 30 between gill opening and caudal base; tubes 26 to 30 in lateral line; 6 to 8 scales above lateral line and 15 to 18 below. Scales with 14 to 21 basal radiating striae, more parallel and marginal with age, and 1 to 7 incomplete auxiliaries; apical denticles 113 to 322, with 10 to 15 transverse series of basal elements; circuli very fine.

D. XII or XIII, 23, i or 24, i, last spine 1⅔ to 2⅛ in head, filament 1⅓ in young to 1½ in combined head and body with age; A. III, 20, i or 21, i, third spine 1⅞ to 2, ninth ray 1⅓ to 1⅖; least depth of caudal peduncle $3\frac{1}{10}$ to $3\frac{2}{5}$; caudal $1\frac{2}{3}$ to $1\frac{4}{5}$, hind edge broadly convex; pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$; ventral $1\frac{1}{4}$ to $1\frac{2}{5}$.

Brown, lighter on breast and abdomen. On front of back five parallel somewhat diffuse deep brown lines slope up from head obliquely to spinous dorsal. From last line 9 parallel oblique deep brown lines slope down toward anal. Broad black band from supraoccipital down to eye and below much wider across lower surface of head; with age on cheek band even wider to extend across opercle over on front of opercle, though in young scarcely extended behind hind eye edge. Edge of soft dorsal narrowly black. Black ocellus superiorly on soft dorsal or on upper half medially; about size of eye in young, with age long as snout. Anal with pale edge and blackish submarginal line. Hind caudal edge pale, with dusky, narrow, submarginal line. Paired fins brown.

Red sea, Zanzibar, Mozambique, Mauritius, Reunion, Seychelles, India, Nicobars, East Indies, China, Micronesia, Melanesia, Polynesia. The elongated dorsal filament is the accompaniment of age, and quite variable.

875, 10323. Balikias Bay, Lubang Island. July 17, 1908. Length 94 to 165 mm.

4732. Batan Island. June 5, 1909. Length 124 mm.

4760. Biri Channel. June 2, 1909. Length 128 mm.

996. Bubuan Island. February 14, 1908. Length 168 mm.

619, 620, 1098. Bugsuk Island. January 5, 1909. Length 43 to 127 mm.

1245. Candaraman Island. January 4, 1909. Length 114 mm.

602. Casogoran, Malhon Island. July 27, 1909. Length 131 mm.

251 [1009]. Caxisigan Island, near Balabac Island. January 2, 1909. Length 122 mm. Bleeker's figure shows reds near contour of fins too bright, scarcely appearing at all on caudal peduncle except at front. No yellow crescent bar. General color of side slaty with slight purplish tinge. Iris red. Bar behind eye joins fellow behind ventrals and continues as median orange stripe on belly. Dorsal spines orange, membranes nearly colorless or pale yellowish; tip of soft dorsal including vertical edge blackish, then dusky followed by narrow paler line and dark margin to orange beneath; dusky bar crosses caudal peduncle as pale bar reaching on to anal. Anal margin first dusky hyaline, then narrowly pale submarginally adjoining black to broader orange. End of caudal dusky hyaline for width equal to pupil; with narrower pale yellow submarginal bar, then trilinear bar with central line orange brown and other 2 black. Dull orange stripe across pectoral base and opercle flap.

344. Endeavor Strait. December 22, 1908. Length 344 mm.

159, 161 to 163, 1292, 3888. Endeavor Strait. December 23. 1908. Length 105 to 142 mm.

4869. Galera Bay, Mindoro. June 9, 1908. Length 153 mm.

7272. Gigoso Point, Quinapundan Bay, Samar. July 28, 1909. Length 132 mm.

429. Langao Point, Luzon. June 24, 1909. Length 142 mm.

976. Ligpo Point. January 18, 1908. Length 145 mm.

5969. Little Santa Cruz Island. May 26, 1908. Length 195 mm.

6025. Little Santa Cruz Island. May 28, 1908. Length 165 mm.

8842. Maculabo Island. June 14, 1909. Length 163 mm.

8842. Mahinog, Camiguin Island. August 3, 1909. Length 196 mm.

340, 341, 812 to 814. Makesi Island. April 5, 1909. Length 77 to 131 mm.

6239, 6273. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 170 to 175 mm.

820. Mompog Island. March 3, 1909. Length 160 mm.

3596, 8215. Pagapas Bay, Luzon. February 20, 1909. Length 150 to 190 mm.

1211. Port Banalacan. February 23, 1909. Length 161 mm.

4644. Port Binanga, Subig Bay. January 8, 1908. Length 148 mm.

1174, 1175. Port Binanga. January 9, 1908. Length 57 to 92 mm.

504. Port Ciego, Balabac. January 3, 1909. Length 127 mm.

10388. Port Jamelo, Luzon. July 13, 1908. Length 155 mm.

967, 10337. Port Maricaban. July 21, 1908. Length 115 to 164 mm.

1021. Port Matalvi. November 22, 1908. Length 118 mm.

935. Pujada Bay. May 15, 1908. Length 141 mm.

8215. Refugio Island, Pasacao, Ragay Island. March 9, 1909. Length 190 mm.

1045, 11046. Sabtan Island. November 8, 1908. Length 117 mm.

1148 [758], 1149 [770]. Sablayan, Mindoro. December 13, 1908. Length 38 to 39 mm. General color like adult, lower series of black lines indistinct. Black vertical band from near tip of last dorsal spine to middle of anal, behind cadmium orange. Caudal peduncle orange, slightly dusky behind. Dorsal spines posteriorly tipped with black, which continues as narrow black bar across soft fin, ending near middle of vertical edge; midway in soft fin this expands about width of ocular band in lens-shaped enlargement; fin edge hyaline. Anal spines and edge of soft fin orange, black bar showing only on posterior portion. Caudal fin hyaline.

Three examples. Sacol Island. September 8, 1909. Length 21 to 225 mm.

668. Taganak Island. January 7, 1909. Length 138 mm.

One example. Great Tobea Island, tide pool. December 15, 1909. Length 30 mm.

378. Tara Island. December 14, 1908. Length 125 mm.

588. Tara Island. December 15, 1908. Length 116 mm.

1004. Tataan, Simaluc Island. February 20, 1908. Length 103 mm.

10372. Tilig Bay, Lubang Island. July 15, 1908. Length 133 mm.

510. Ulugan Bay, near Rita Island. December 29, 1908. Length 152 mm.

Two examples. Varadero Harbor. July 22, 1908. Length 19 to 21 mm.

4685. Apra Bay, Guam. November 19–20, 1907. Length 70 mm.

Ten examples. Talisse Island. November 8, 1909. Length 22 to 24 mm.

Ten examples. Talisse Island, Dutch East Indies. November 8, 1909. Length 20 to 24.

19236 U.S.N.M. Fanning Islands. Dr. T. H. Streets. Length 170 to 178 mm. Two examples.

26831 U.S.N.M. Johnston Island. Length 190 mm.

42344 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 118 to 162 mm. Six examples.

55101 U.S.N.M. Honolulu, Hawaii. *Albatross* collection, 1906. Length 112 mm.

55348 U.S.N.M. Honolulu. *Albatross* collection. Length 118 mm.

55958 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 117 mm. [3694].

57001 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 110 to 120 mm. Two examples.

61702 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 88 to 160 mm. Nineteen examples.

65793 U.S.N.M. Makemo, Paumotus. *Albatross* collection (A. 76, A. 85, A. 101). Length 132 to 190 mm. Three examples.

65794 U.S.N.M. Tari Tari, Gilbert Islands. *Albatross* collection. Length 178 mm.

65795 U.S.N.M. Kusaie, Carolines. *Albatross* collection. In poor preservation. Length 63 mm.

71514 U.S.N.M. Tanegashima, Japan. *Albatross* collection, 1906. Length 27 to 40 mm. Two examples.

71751 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 70 to 178 mm. Four examples.

79260 U.S.N.M. Philippines. E. H. Taylor (B. 205). Length 80 to 95 mm. Two examples.

83254, 83331, 83445 U.S.N.M. No locality. Likely Samoa or Hawaii? Wilkes Exploring Expedition. Length 55 to 180 mm.

The following *Tholichthys* forms apparently belong with this species: Five examples. Varadero Harbor, Mindoro. July 22, 1908. Length 19 to 21 mm. D. XIII, 23; A. III, 20 or 21.

CHAETODON VAGABUNDUS Linnaeus

Chaetodon vagabundus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 276. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 465.—Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 88, pl. 204, fig. 2, (East Indies).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1251 (India).—Bloch, Naturg. Ausl. Fische, vol. 9, 1795, p. 100 (Tranquebar).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 413 (on Linnaeus and Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 222 (Indian Seas).—Lacépède. Hist. Nat. Poiss., vol. 4, 1802, pp. 456, 479 (Asia).—Bennett, Fishes of Ceylon, 1828, pl. 7.—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 50 (Mauritius, Vanicolo, Moluccas, Amboina, Tahiti).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 25 (Mauritius, Amboina).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 154 (Africa, Moluccas, Tahiti).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 25.—Playfair, Fishes of Zanzibar, 1866, p. 34 (Aden).—Guichenot, Mém. Soc. Hist. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 145 (Madagascar).—Kner, Reise Novara, Fische, 1865, p. 271 (Java).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 43 (Polynesia).—Day, Fishes of India, pt. 1, 1875, p. 105, pl. 27, fig. 1 (Andamans).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Günther, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes; Cebu; Ternate).—Day, Fauna Brit. India, vol. 2, 1889, p. 4, fig. 1.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 486 (Luzon, Batangas, Nasugbu, Cavite, Naic, Cebu).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 532 (Okinawa).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 544 (Padang).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 96, (Bacon).—Steindachner, Denkschr. Akad. Wiss. Wien, Math. Naturw. Kl., vol. 71, abth. 1, 1907, p. 138 (Makalla, South Arabia).—Regan, Ann. Durban Mus., 1908, p. 245 (Kosi Bay).—Gilchrist and Thompson, Ann. South Afric. Mus., vol. 11, pt. 2, 1911, p. 34 (Natal).—Snyder, Proc. U.S. Nat. Mus., vol. 42, 1912, p. 422 (Misaki and Tanegashima), p. 510 (Okinawa).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 124 (Sorong, New Guinea).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 307 (Menado, Karakelang, Salibabu, Saleyer).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Diégo Suarez, Madagascar); Bull: Mus. Hist. Nat. Paris, 1914, No. 3, p. 2 (Baie de Tamatave, Madagascar).—Jordan and Starks, Ann. Carnegie Mus., vol. 11, 1917, p. 457 (Ceylon).—McCulloch, Rec. Austral. Mus., vol. 14, No. 1, 1923, p. 3, pl. 1, figs. 1–2 (Cairns Reef off Cooktown, Queensland).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 153 (Indian Ocean, Ralum, New Guinea, Matupi, German New Guinea, New Pomerania, South Sea, Samoa, French Islands, Amboina, East Indies, Mauritius, Takao).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar); Bishop Mus. Bull., No. 22, 1925, p. 33 (Samoa).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 8 (Poeloe Tockus Island, Sumatra).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 32, pl. 5, fig. 2 (Curimao, Balaoan, Iba, Mariveles, Aloneros, Calapan, Gigantangan, Tagbilaran, Clarendon Bay, Zamboanga, Pearl Bank, Basbas, Bungau, Bilatan, Sibutu, Sitanki).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 611 (Natal, Zululand, Delagoa Bay, Mozambique).

Chetodon vagabundus Bonnaterre, Tabl. Ichth., 1788, p. 89 (India).

Tetragonoptrus (*Linophora*) *vagabundus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 7, 1877, p. 48, pl. (16) 378, fig. 1 (Sumatra, Batu, Nias, Java, Bawean, Celebes, Sangi, Sumbawa, Timor, Ternate, Batjan, Buru, Ceram, Amboina, Harucu, Goram, Banda, Aru).

Chaetodon pictus Forskål, Descr. Animal., 1775, pp. xiii, 65. Mochha, Red Sea.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1269 (Arabia).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 422 (on Forskål).—Schneider, Hist. Nat. Poiss., vol. 4, 1802, pp. 457, 484 (Arabia, Mauritius).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 24 (Madras).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 154 (Africa, Asia, Moluccas, Tahiti).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 781 (Koseir, Red Sea).—Day, Fishes of India, pt. 1, 1875, p. 105, pl. 26, fig. 2 (Andamans).

Chaetodon (*Anisochaetodon*) *vagabundus* var. *pictus* Klunzinger, Fische Roth. Meer., 1884, p. 56.

Chaetodon speciosus (Parkinson) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 52. Tahiti.

Chaetodon decussatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 54. Pondichery.—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 152 (no locality).

Chaetodon vagabundus var. *jordani* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 181 (on Jordan and Starks).

Depth 1½ to 1⅔; head 2¾ to 3⅕, width 2⅛ to 2⅖. Snout 2⅗ to 2¾ in head; eye 3⅕ to 3⅔, 1¼ to 1⅖ in snout, greater than interorbital in young to 1⅕ in interorbital with age; maxillary ½ to ⅗ in snout, 3¾ to 4¼ in head; interorbital 3 to 3¾, broadly convex. Gill rakers 4+11, short points, 4½ in gill filaments, which 1⅗ in eye.

Scales 29 or 30 between gill opening and caudal base; tubes 31 to 34 in lateral line; 7 or 8 scales above lateral line, 14 or 15 below. Scales with 10 to 24 basal radiating striae, and 1 to 3 incomplete auxiliaries; apical denticles 103 to 162, with 6 to 8 series of basal elements transversely; circuli fine.

D. XII or XIII, 23, i or 24, i, last spine 2⅒ to 2⅔ in head, thirteenth ray 1⅖ to 1¾; A. III, 20, i, third spine 1⅔ to 2, tenth ray, 1⅗ to 1⅔; least depth of caudal peduncle 3 to 3⅛; caudal 1½ to 1⅗, hind edge convex; pectoral 1⅛ to 1⅕; ventral 1½ to 1⅗.

Brown, little paler on sides below opercle, breast and belly. Six oblique diffuse dusky lines to spinous dorsal, all parallel; from last line 12 oblique parallel lines slope towards anal. Broad black band from predorsal to eye, wider below on cheek and extends over lower surface of head. Upper edge of soft dorsal black, and black band from front of fin medianly extends obliquely over base of fin posteriorly, then down over front of caudal peduncle to middle of posterior anal rays. Anal edge narrowly white, with submarginal black line. Caudal with hind edge narrowly white, with narrow submarginal black band; medially black band, broad, narrowing above and below. In young, submarginal black band appears only as median dark line close behind broad dark median band. Paired fins pale brown.

Red Sea, Madagascar, Mauritius, Reunion, India, Ceylon, Nicobars, Andamans, East Indies, China, Queensland, Melanesia, Polynesia. Though showing slight structural variations the color pattern is very uniform in our materials. A very young example shows the caudal uniformly pale. In 2 examples (226 and 554) the dark lines are interrupted and variably irregular on the right and left sides respectively though the opposite side of each is of the normal pattern.

786. Agojo Point, Catanduanes Island. June 10, 1909. Length 128 mm.
1, 2, 1318. Alibijaban Island. March 6, 1909. Length 126 to 137 mm.
577, 950, 951. Alimango Bay. March 5, 1909. Length 98 to 123 mm.
619. Bugsuk Island. January 5, 1909. Length 43 mm.
9659, 9660. Cagayan, Sulu Island. January 8, 1909. Length 125 to 133 mm.
266. Cagayanes Island. March 31, 1909. Length 118 mm.
1326. Calangaman Island. March 16, 1909. Length 156 mm.
1121, 1123. Near Daet, Canimo Island. June 15, 1909. Length 150 to 158 mm.
1027, 1225, 12096. Capunuypugan Point, Mindanao. May 10, 1908. Length 106 to 120 mm.
1204 to 1205. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 130 to 132 mm.
715. Caracaran, Batan Island. June 8, 1909. Length 127 mm.
601. Casogoran, Malhon Island. July 27, 1909. Length 130 mm.
4818. Cebu market. April 4, 1908. Length 111 mm.
912, 913. Endeavor Strait, Chase Island. December 22, 1908. Length 145 to 148 mm.
327 and 328, 1294, 1295. Endeavor Strait. December 23, 1908. Length 122 to 147 mm.
226. Endeavor Strait. December 24, 1908. Length 161 mm.
4872. Galera Bay, Mindoro. June 9, 1908. Length 112 mm.
554, A1209. Gomomo Island. December 3, 1909. Length 130 to 137 mm.
4615 to 4617. Grande Island reef, Subig Bay. January 8, 1908. Length 130 to 134 mm.
776, 777. Jolo. March 6, 1908. Length 73 to 107 mm.
888 to 891. Jolo. March 7, 1908. Length 80 to 122 mm.
4836. Jolo market. February 11, 1908. Length 155 mm.
10365. Tilig, Lubang Island. July 14, 1908. Length 105 mm.
10373. Tilig July 15, 1908. Length 117 mm.
1063. Ligpo Point. January 1, 1908. Length 140 mm.

918. Ligpo Point. January 18, 1908. Length 150 mm.

7970. Little Santa Cruz Island. May 26, 1908. Length 123 mm.

1115. Little Santa Cruz. May 28, 1908. Length 145 mm.

644. Lode Bay, Destacado Island. March 13, 1909. Length 188 mm.

1263. Mactan Island. March 25, 1909. Length 133 mm.

811. Maculabo Island. June 14, 1909. Length 102 mm.

1009 and 1010, 4704 and 4705. Mansalay, Mindoro. June 4, 1908. Length 122 to 132 mm.

1077, 1078. Masbate Reef, Masbate. April 20, 1908. Length 124 to 134 mm.

821, 822. Mompog Island. March 3, 1909. Length 130 to 132 mm.

8226. Murcielagos Bay. August 20, 1909. Length 96 mm.

9033. Nabatas Point, Samar. July 24, 1909. Length 169 mm.

992, 4865. Nasugbu Cove, Luzon. January 16, 1908. Length 133 to 137 mm. Generally silvery with straw yellow tinge, shading to chromes of soft vertical fins. Orange brown stripes across forehead; oblique bars smoky black, centers very narrow lines with smoky edges. Spinous dorsal membrane pearl gray, spines dark and tips from sixth posteriorly dark, forming front of black submarginal bar crossing soft dorsal; extreme tips of soft dorsal black, blue beneath. Anal spines and rays tipped lemon yellow, with narrow submarginal white stripe, then black and yellow, black showing as oblique bars across first 2 spines.

718. Near Palag Bay. June 16, 1909. Length 143 mm.

One example. Pagapas Bay, Luzon. February 20, 1909. Length 110 mm.

274. Paluan Bay, Mindoro. December 11, 1908. Length 120 mm.

927. Panabutan Bay. February 6, 1908. Length 133 mm.

11, 446. Pandanon Island. March 23, 1909. Length 81 to 84 mm.

797. Parang, Mindanao. May 23, 1908. Length 124 mm.

1300 to 1307. Polloc. May 23, 1908. Length 111 to 135 mm.

1192. Port Dupon. March 17, 1909. Length 128 mm.

712. Port Galera. June 9, 1909. Length 143 mm.

1094, 10390, 10392 to 10394. Port Jamelo, Luzon. July 13, 1908. Length 126 to 139 mm.

630, 964, 965. Port Maricaban. July 21, 1908. Length 122 to 140 mm.

985. Port Matalvi. November 23, 1908. Length 126 mm.

19627. Port Palapag. June 3, 1904. Length 106 mm.

638 to 640. Port Tilig. July 15, 1908. Length 100 to 105 mm.

929 to 932. Pujada Bay. May 15, 1908. Length 117 to 125 mm.

650. Rapurapu. June 22, 1909. Length 133 mm.

599. Romblon. May 26, 1908. Length 68 mm.

1047, 1048, 19249. Sabtan Island. November 8, 1908. Length 90 to 135 mm.

675 to 677, 695, 696. Sablayan, Mindoro. December 13, 1908. Length 106 to 128 mm. Generally very pale to dusky silvery, tinged with pale lemon. Lower head, breast and belly white. Forehead with 6 transverse orange bars. Diagonal lateral bars slaty. Black bar begins obscurely at fourth dorsal spine continued across spinous portion terminally, curves forward on soft dorsal, widens, crosses base at caudal peduncle and extends half way to lower anal edge; below basal portions of soft rays dark ; dorsal yellow medially, begins on antepenultimate spine, broadens and curves above black bar, covers about central third to vertical edge ; above this black, becoming distinct on tips of third and fourth spines, continued as narrow bar to vertical edge and above on soft fin narrow bright blue bar, extreme soft edge black ; spinous membranes pale and fronts of spines more or less dusky and black ; posterior vertical fins bright cadmium. Anal spines pale yellow, membranes dusky, terminal half

of fin cadmium except sulphur margin with narrow white and black submarginal bars. Caudal yellow, except lenticular basal bar and narrower blackish one submarginal, extreme edge hyaline. Paired fins slightly dusky.

1148 and 1149. Sablayan. December 13, 1908. Length 38 mm. [758, 770].

1203. Sanguisiapo Island. February 24, 1908. Length 121 mm.

762. San Miguel Harbor, Tiaco Island. April 21, 1908.

6911. Santo Domingo, Batan. November 7, 1908. Length 142 mm.

571 to 573. Surigao, Mindanao. March 8, 1908. Length 130 to 149 mm.

876 [186], 881 [187]. Tataan, Simaluc Island. February 20, 1908. Length 130 to 132 mm. Ground color, olive gray, becomes white below. Forehead crossed by 5 narrow orange lines and ocular bar broad. Lower head and breast white. Double series of oblique gray lines cross side; front series of 6 from dorsal down and forward, hindmost in line with hind opercle edge; 12 pass obliquely down from hindmost to anal base, interspaces wide as pupil, anterior ones slightly wider. Dorsal olive gray anteriorly, bright yellow posteriorly, tipped from fourth or fifth spine backward with black; another black band begins at about same point and passes backward under first, turns downward across middle of soft dorsal, crosses caudal peduncle and extends into anal space about breadth of caudal peduncle. Anal olive gray basally, shading to pale cadmium tipped with sulphur yellow resting on gray line with broader black below. Caudal yellow, tip hyaline adjoining narrow black band, also broader black median band. Pectoral hyaline, rays with narrow black lines. Ventral white.

497. Tataan, Tawi Tawi Group. February 21, 1908. Length 127 mm.

10401, 10446. Tilig, Lubang Island. July 14, 1908. Length 109 to 112 mm.

533. Usada Island. March 5, 1908. Length 130 mm.

10410, 10438, 10440. Varadero Bay, Mindoro. July 23, 1908. Length 128 to 132 mm.

893. West coast of Palaui Island. November 18, 1908. Length 141 mm.

A1267. Uki, Bouro Island, Dutch East Indies. December 9, 1909. Length 150 mm.

A1599. Soo Wan, Formosa. January 29, 1910. Length 140 mm.

654, 655, 660, 661. Nan Wan, Formosa. January 25, 1910. Length 110 to 155 mm.

665 and 673. Hokuho, Soo Wan. January 29, 1910. Length 130 to 148 mm.

30649 U.S.N.M. New Guinea. Australian Museum. Length 99 mm.

30652 U.S.N.M. New Guinea. Australian Museum. Length 117 mm.

32732 U.S.N.M. Indian Archipelago. Leiden Museum. Length 108 mm.

41551 U.S.N.M. Samoa. Dr. C. H. White. Length 135 mm.

41562 U.S.N.M. Samoa. Dr. C. H. White. Length 43 mm.

43935 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 77 to 150 mm. Nine examples.

52497 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 22 to 144 mm. Ten examples.

55957 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 135 mm. [3387].

61701 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 148 to 154 mm. Two examples.

71515 U.S.N.M. Tanegashima, Japan. *Albatross* collection, 1906. Length 40 to 48 mm. Two examples.

71732 U.S.N.M. Nafa, Okinawa, Riu Kiu. *Albatross* collection, 1906. Length 23 to 38 mm. Two examples.

71944 U.S.N.M. Misaki, Sagami Bay, Japan. *Albatross* collection, 1906. Length 26 mm.

CHAETODON ASSARIUS Waite

Chaetodon assarius Waite, Rec. Austral. Mus., vol. 6, 1905, p. 66, pl. 11, fig. 1. Between Freemantle and Houtman's Abrolhos.

D. XIII, 21; A. III, 17. Yellow or pale brown. Dark ocular band present. Four dark narrow bars on side slightly inclined. Black ocellus, little less than eye at angle of soft dorsal. Anal with submarginal blackish band. Length 119 mm. (Waite.)

CHAETODON RAFFLESII Bennett

Chaetodon rafflesii Bennett, Life of Raffles, 1830, p. 689. Sumatra.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 27 (types; Amboina); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 44, pl. 35, fig. C (Pelew Islands; Fiji).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Meyer, An. Soc. Española Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 419 (Batjan).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 8 (Poetoe Tokus Island, Sumatra).

Chaetodon rafflesi Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 158 (New Pomerania, Amboina, New Hannover, Pitatuki Buka, Thalassia, New Guinea, Ralum, Sipora, Matupi).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 36, pl. 6, fig. 2 (Aloneros, Calapan, Tagbilaran, Canigaran, Cotabato, Tubigan).

Tetragonoptrus (*Linophora*) *rafflesi* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 49 (Sumatra, Java, Bawean, Celebes, Sumbawa, Timor, Halmaheira, Ternate, Ceram, Amboina, Haracu, Goram, Aru, Waigiu, New Guinea).

Chaetodon princeps Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 33. New Ireland.—Lesson, Voy. Coquille, Zool., vol. 2, pt. 1, 1830 (1831), p. 177 (Port Praslin, New Ireland).

Chaetodon sebae Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 52. New Guinea.

Coradion chrysozonus (not Cuvier) Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 49, pl. (14) 376, fig. 5.

Depth 1⅗ to 1⅔; head 2¾ to 2⅞, width 2¼ to 2⅖. Snout 2½ to 2⅔ in head; eye 3 to 4, 1 to 1½ in snout, greater than interorbital in young to 1⅛ in interorbital with age; maxillary ½ to ⅗ in snout, 3½ to 3¾ in head; interorbital 3¾ to 4, broadly convex. Gill rakers 4 + 9, short points, 4½ in gill filaments which 1½ in eye.

Scales 27 to 29 between gill opening and caudal base; scales 26 or 27 in lateral line; 5 or 6 scales above lateral line, 12 or 13 below. Scales with 9 to 18 basal radiating striae; apical denticles 61 to 157, with 7 to 12 transverse series of basal elements; circuli fine.

D. XIII, 22, i or 23, i, last spine 1⅓ to 1⅗ in head, twelfth ray 1⅖ to 1¾; A. III, 19, i or 20, i, third spine 1¾ to 1⅘; tenth ray 1½ to 1⅗; least depth of caudal peduncle 3¼ to 4; caudal 1½ to 1⅘, hind edge slightly convex; pectoral 1¼ to 1½; ventral 1¼ to 1⅓.

Brown, paler on breast, abdomen and lower surfaces. With age large diffuse dusky blotch, longer than head, on front side of back.

Body scales all with slightly darker brown borders, producing reticulate appearance. Black band from predorsal to eye and below, where broader to gill opening but not across chest. Edges of soft dorsal and anal white, with submarginal blackish band narrowly, only line on anal; in young band on dorsal forms black blotch at posteromedian rays but little smaller than eye; also dark submarginal line on anal absent. Caudal with hind edge narrowly gray, then submarginal yellowish band, median black crescent and fin base light brown; in young outer ⅗ of caudal grayish, with median black crescent subbasal. Paired fins dull brown.

East Indies, Melanesia, Micronesia, Polynesia.

1321. Alibijaban Island. March 6, 1909. Length 133 mm.
949, 1281. Alimango Bay. March 5, 1909. Length 90 to 132 mm.
1237. Candaraman Island. January 4, 1909. Length 135 mm.
1206, 1207. Capulaan Bay, Pagbilao. February 24, 1909. Length 128 mm.
1025, 1026, 1028. Capunuypugan Point. May 10, 1908. Length 111 to 133 mm.
714. Caracaran, Batan Island. June 8, 1909. Length 135 mm.
725. Canmahala Bay. March 11, 1909. Length 142 mm.
4819. Cebu market. April 4, 1908. Length 105 mm.
1218, 1222, 4867. Galera Bay, Mindoro. June 9, 1908. Length 127 to 140 mm.
359, 442. Galvaney Island, Luzon. March 9, 1909. Length 131 to 137 mm.
4618. Grand Island reef, Subig Bay. January 8, 1908. Length 137 mm.
1153. Hermana Mayor. March 8, 1909. Length 138 mm.
1061, 1062. Ligpo Point. January 1, 1908. Length 136 to 140 mm.
4696, 4699, 7972. Little Santa Cruz Island. May 26, 1908. Length 92 to 142 mm.
1114, 4886. Little Santa Cruz Island. May 28, 1908. Length 133 to 145 mm.
1008, 4703, 4706, 4707. Mansalay, Mindoro. June 4, 1908. Length 110 to 130 mm.
528. Mansalay. June 9, 1908. Length 130 mm.
3631. Maribojoc Bay, Bohol Island. March 26, 1909. Length 105 mm.
1015. Maricaban Island. January 20, 1908. Length 138 mm.
1076. Masbate Reef, Masbate Island. April 20, 1908. Length 120 mm.
823, 3598. Mompog Island. March 3, 1909. Length 127 to 138 mm.
391, 392. Near Palag Bay, Luzon Island. June 16, 1909. Length 115 to 121 mm.
362, 363, 1265 to 1268. Pagapas Bay. February 20, 1909. Length 90 to 137 mm.
17660. Pandanon Island. March 23, 1909. Length 42 mm.
3878. Pandanon Island. March 24, 1909. Length 55 mm.
10391. Port Jamelo, Luzon. July 13, 1908. Length 142 mm.
968. Port Maricaban. July 21, 1908. Length 140 mm.
984. Port Matalvi. November 23, 1908. Length 120 mm.
933. Pujada Bay. May 15, 1908. Length 100 mm.
758 to 761. San Miguel Harbor, Ticao Island. April 21, 1908. Length 122 to 128 mm.
379. Tara Island. December 14, 1908. Length 130 mm.
1160 [162]. Tataan, Simaluc Island. February 19, 1908. Length 130 mm. Center of each scale bright sulphur yellow with dusky overshades, margins with dark yellowish olive forming like mosaic. Large blackish blotch below spinous dorsal nearly obliterates yellow, inner area nearly large as head.

Ocular band black, not wide as eye above, increasing in width across cheek and subopercle. Forehead pearl gray. Opercle edge bright chrome. Snout with cadmium shades above. Iris black like band across eye. Spinous dorsal membranes greenish, front of each spine blackish, tips of last four and edge of soft dorsal bright chrome with submarginal black line, becomes wide as pupil on vertical portion; then band of greenish yellow, somewhat narrower than black and continuous with greenish of spinous fin; pinkish blotch covers upper portion of scaled region of soft dorsal. Anal dull orange, edge sulphur yellow including most of first 2 spines, then adjoining submarginal pearl gray narrow line and black on yellow of vertical margin. Caudal bright chrome, edge width of pupil behind hyaline, then submarginal yellow band equally wide followed by black band nearly equal to eye at widest portion. Pectoral bright chrome basally, terminal ⅔ dusky hyaline. Ventral dusky sulphur yellow.

565, 566. Tataan, Simaluc Island. February 20, 1908. Length 128 to 130 mm.
672. Maitara Island. November 26, 1909. Length 140 mm.
485. Talisse Island. November 9, 1909. Length 121 mm.
530, 531. Usada Island. March 5, 1908. Length 130 to 133 mm.
10437, 10439. Varadero Bay, Mindoro. July 23, 1908. Length 125 to 130 mm.
21112. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 47 mm.
52323 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 138 to 148 mm. Four examples.

CHAETODON MERTENSII Cuvier

Chaetodon mertensii Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 47. No locality. (Russian Expedition, Captain Lütke).—Day, Fishes of India, pt. 1, 1875, p. 105, pl. 27, fig. 2 (Ceylon, Mauritius).

Chaetodon mertensi Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 45, pl. 36, fig. B (Paumotus).—Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 341 (Apia and Pago Pago).

Citharoedus mertensi Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 143.

Tetragonoptrus (Linophora) mertensi Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 50 (Amboina).

Chaetodon (Anisochaetodon) mertensii Klunzinger, Fische Roth. Meer., 1884, p. 57.

Chaetodon chrysurus (not Schneider 1801) Desjardins, Proc. Zool. Soc. London, 1833, p. 117 (Mauritius).—Day, Fauna Brit. India, vol. 2, 1889, p. 6.—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 161 (Mauritius).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sept. 1927, p. 35, pl. 8, fig. 1 (Puerto Galera).

Chaetodon xanthurus Bleeker, Act. Soc. Sci. Ind. Néerland., vol. 2 (Amboina), 1857, p. 53. Amboina.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 515 (Aneiteum).

Choetodon (Tetragonoptrus) xanthurus Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 261, pl. 29, fig. 1.

Tetragonoptrus (Linophora) xanthurus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, pl. (16) 378, fig. 3.

Chaetodon guttatissimus (not Bennett) Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 780 (Red Sea).

Chaetodon dixoni Regan, Ann. Mag. Nat. Hist., vol. 13, ser. 13, 1904, p. 276, fig. New Hebrides.

Chaetodon chrysurus subspecies *paucifasciatus* Ahl, Arch. Naturg., vol. 89, abth. A, Heft. 5, 1923, p. 162. Koseir, Red Sea.

Chaetodon chrysurus subspecies *madagaskariensis* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 163. Madagascar.

Depth 1⅔ to 1¾; head 2⅔ to 3⅖, width 2 to 2⅓. Snout 2⅗ to 2⅘ in head; eye 2⅞ to 3½, 1⅕ to 1¼ in snout, greater than interorbital in young to nearly equal with age; maxillary ½ to ⅗ in snout, 3⅓ to 4 in head; interorbital 3½ to 4, broadly convex. Gill rakers 4+12, short points, ⅕ of gill filaments, which 1½ in eye.

Scales 22 to 26 between gill opening and caudal base; tubes 30 to 35 in lateral line; 5 scales above lateral line, 12 or 13 below. Scales with 16 to 24 basal radiating striae; apical denticles 101 to 185, with 8 to 14 transverse series of basal elements; circuli fine.

D. XII or XIII, 21, I or 22, I, fourth spine 1½ to 1⅗ in head, eighth ray 1⅓ to 1⅖; A. III, 16, I or 17, I, third spine 1⅓ to 1⅖, third ray 1⅒ to 1⅕; least depth of caudal peduncle 3 to 3⅛; caudal 1⅖ to 1½, hind edge straight; pectoral 1⅛ to 1⅕; ventral 1 to 1⅙.

Brown, paler below and on tail and posterior vertical fins. Median enlarged scales of body each with dusky border and large grayish or pale spot, whole pattern reticulate; bounded forward by uniform scales on predorsal and breast; bounded posteriorly by somewhat contrasted uniform pale area on hind part of tail, line of demarcation arched from ends of soft dorsal rays down and back to ends of longest anal rays. Black saddlelike ocellus on predorsal medially, border whitish. Black vertical band from occiput to eye, narrowed below eye across cheek, but not reaching gill opening; above eye band with white bordering line in front and behind. Soft dorsal and anal edged white, with black submarginal line. Hind caudal edge gray, then narrow submargin pale yellowish crescent with front edge with brown bordering line; fin with median broad and very pale brown crescent, base light yellowish. Paired fins uniformly pale brown.

Red Sea, Mauritius, Ceylon, East Indies, Melanesia, Polynesia. Known by its greatly enlarged median scales of the body, darkly reticulated.

792, 9654 [1630], 9655 [1633]. Agojo Point, Catanduanes Island. June 10, 1909. Length 92 to 98 mm.
854, 855. Atulayan Island. June 18, 1909. Length 84 to 95 mm.
920. Balikias Bay, Lubang. July 17, 1908. Length 85 mm.
167. Busin Harbor, Burias Island. March 8, 1909. Length 110 mm.
21584, 21585. Guiniyan Island. June 4, 1909. Length 56 to 84 mm.
3632. Maribojoc Bay, Bohol Island. March 26, 1909. Length 99 mm.
608, 609, 1093, 1228. Murcielagos Bay. August 9, 1909. Length 87 to 100 mm.
8225. Murcielagos Bay. August 20, 1909. Length 103 mm.
4858. Murcielagos Bay. August 21, 1909. Length 64 mm.
383 to 386. Near Palag Bay, Luzon. June 16, 1909. Length 95 to 101 mm.
10405. Northwest of Verde Island. July 22, 1908. Length 105 mm.
737, 20567. Opol, Mindanao Island. August 4, 1909. Length 102 to 108 mm.
626. Port Banalacan, Marinduque. February 23, 1909. Length 101 mm.
707, 732. Port Galera, Mindoro. June 9, 1908. Length 106 to 113 mm.
4814. Port Galera. October 27, 1909. Length 108 mm.
782, 783. Port Matalvi. November 23, 1908. Length 95 mm.

9641 [439]. Romblon Reef. March 25, 1908. Length 78 mm. Pearl gray to white, edges of scales blackish, giving rise to double row of oblique lines. Ocular bar and nuchal blotch black, surrounded above eye by pale metallic yellow line; nuchal blotch same. Scales on upper portion of side with upper posterior edge yellowish. Front and tip of each dorsal spine bright yellow. Soft dorsal with creamy margin resting on submarginal black line, below which yellow of spinous tips carried as obscure bar. Front of anal pearl gray; edge of soft anal narrowly edged with cadmium; cream and black lines as on dorsal but narrower. Broad cadmium orange bar across vertical edges of dorsal and anal, includes body and front of caudal peduncle. Cadmium orange bar across caudal medially, base of fin dusky white, hind edge hyaline with creamy and black submarginal lines.

20051. Romblon. March 26, 1908. Length 84 mm.

766. San Miguel Harbor, Ticao Island. April 21, 1908. Length 90 mm.

3882. San Miguel Bay. June 4, 1909. Length 99 mm.

18862, 18863. Tilig, Lubang. July 15, 1908. Length 66 to 86 mm.

511. Ulugan Bay, near Rita Island. December 29, 1908. Length 80 mm.

43934 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 109 mm.

52514 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 71 to 80 mm. Two examples.

CHAETODON ARGENTATUS Smith and Radcliffe

Chaetodon argentatus SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 319, fig. 1. Agojo Point, Southern Luzon.—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 33, pl. 4, fig. 2 (copied).

Depth 1⅔ to 1⅘; head 3 to 3⅛, width 1⅞ to 2. Snout 2¼ to 2½ in head from snout tip; eye 3 to 3⅛, 1 to 1⅖ in snout, little greater than interorbital to equal with age; maxillary ½ to ⅗ in snout, 3¾ to 4 in head; interorbital 3¼ to 3⅕, broadly convex. Gill rakers 4 + 15, short, flexible, slender points, ⅕ of gill filaments, which 1⅔ in eye.

Scales 32 or 33 between gill opening and caudal base; tubes 36 to 38 in lateral line; 6 or 7 scales above lateral line, 12 or 13 below. Scales with 17 to 20 basal radiating striae; apical denticles 124 to 148, with 7 or 8 transverse series of basal elements; circuli fine.

D. XIV, 22, I, fourth spine 1⅗ to 1¾ in total head length, fourth ray 1⅖ to 1⅗; A. III, 16, I, third spine 1⅖, third ray 1¼ to 1⅓; least depth of caudal peduncle 2⅞ to 3¼; caudal truncate, 1⅔ to 1⅘; pectoral 1⅕ to 1⅓; ventral 1⅛ to 1⅓.

Whitish generally. Above eyes short narrow blackish bar or broken as two spots. Blackish broad band from predorsal down to opercle above. Second blackish band from middle of spinous dorsal down to middle of side. Third broad blackish band from ends of last dorsal spines and front of soft dorsal down across tail and caudal peduncle to include last anal rays. Soft dorsal edged whitish, then dark submarginal line. Blackish line along edge of scaly basal anal sheath and lower or front edge of soft anal. Caudal pale, with median whitish crescent behind, next to broad blackish one submarginally and dull brown median hind border to fin. Spinous anal with blackish on membranes. Paired fins pale brownish. Iris whitish. Only known from the two examples listed below.

9657 (6735 U.S.N.M.) [1632]. Agojo Point, Catanduanes Island. June 10, 1909. Length 96 mm. Type.

8270 [704]. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 85 mm. No yellow, pale parts silvery, darker parts black. Paratype.

CHAETODON SEMILARVATUS Cuvier

Chaetodon semilarvatus (Ehrenberg) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 39. Red Sea.—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 779 (Red Sea).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 166 (types; Koseir).

Chaetodon (*Anisochaetodon*) *semilarvatus* Klunzinger, Fische Roth. Meer., 1881, p. 57, pl. 11, fig. 1.

All posterior half of head black, head above and anteriorly yellow. No dark posterior bands. Caudal with submarginal black band.

CHAETODON FASCIATUS Forskål

Chaetodon fasciatus Forskål, Descript. Animal., 1775, pp. xii, 59. Djedda, Red Sea.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1266 (Arabia).—Schneider, Syst. Ichth. Bloch, 1801, p. 217 (Red Sea).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 456, 480 (Arabia).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 61 (copied).—Rüppell, Neue Wirbelthiere, Fische, 1835, p. 28.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 24 (Red Sea, China).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 150 (no locality).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 778 (Koseir, Red Sea).—Károli, Termesz. Füzetek, Budapest, vol. 1, 1881, p. 155 (Canton).—Klunzinger, Fische Roth. Meer., 1884, p. 56.—Elera, Cat. Fauna Filipin., vol 1, 1895, p. 486 (Luzon; Manila; Malabar).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 117 (Red Sea).

Tetragonoptrus (*Chaetodontops*) *fasciatus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 41 (part).

Chaetodon flavus Schneider, Syst. Ichth. Bloch, 1801, p. 225. Arabia.—Rüppell, Atlas Reise nördl. Afrik. Fische, 1828, p. 40, pl. 9, fig. 1 (Red Sea).

Differs from *Chaetodon lunula* in the dark basal dorsal band not crossing the caudal peduncle.

CHAETODON LINEOLATUS Cuvier

Chaetodon lineolatus (Quoy and Gaimard) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 40. Mauritius.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 30 (Red Sea).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 151 (Africa, Moluccas).—Playfair, Fishes of Zanzibar, 1865, p. 35 (Zanzibar).—Klunginger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 779 (Koseir, Red Sea).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 45, pl. 34, fig. A (Paumotus, Society Islands, Samoa, Kingsmills, Hawaii); Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—Elera, Cat. Fauna Filipin., vol. 1, 1895. p. 486 (Mindoro).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 52.—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 357

(Hokoto, Formosa).—Pellegrin, Ann. Mus. Zool. Napoli, new ser., vol. 3, No. 27, 1912, p. 6 (Simon Bay, Cape of Good Hope).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 167 (Red Sea, Mauritius, Seychelles, New Hannover).—McCulloch, Rec. Austral. Mus., vol. 14, pt. 1, 1923, p. 4 (Whitsunday Island, Queensland).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 27 (Honolulu).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 8 (Poeloe Toekus Island, Sumatra).—Herre and Montalban Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 47, pl. 10, fig. 2 (Ambil, Batangas, Maricaban, Calapan, Bulalacao Bay, Elefante, Bennett Island, Tagapula, Gigantangan, Cebu, Quiminatin, Sibutu, Sitanki).

Tetragonoptrus (*Oxychaetodon*) *lineolatus* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 51, pl. (15) 377, fig. 2 (Cocos, Sumbawa, Flores, Amboina, Banda).

Chaetodon (*Anisochaetodon*) *lineolatus* Klunzinger, Fische Roth. Meer., 1884, p. 57.

Chaetodon lunatus (Ehrenberg) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 57. Red Sea.—Rüppell, Neue Wirbelthiere, Fische, 1835, p. 30, pl. 9, fig. 3 (Djedda).

Chaetodon tallii Bleeker, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. (90) 97. Neira, Banda.

Depth 1½ to 1¾; head 2⅗ to 3⅛, width 2⅕ to 2¼. Snout 2⅛ to 2¾ in head from snout tip; eye 3⅕ to 5⅕, 1⅛ to 2⅓ in snout, slightly greater than interorbital in young to 1¾ with age; maxillary ⅗ to ¾ in snout, 3⅕ to 3⅓ in head; interorbital 3⅛ to 4, broadly convex. Gill rakers 3 + 12, short points, ⅙ of gill filaments, which equal eye.

Scales 26 or 27 between gill opening and caudal base; tubes 17 to 26 in lateral line; 6 or 7 scales above lateral line, 15 or 16 below. Scales with 8 to 24 basal striae, largely marginal with age; apical denticles 75 to 320, basal elements in 1 to 16 transverse series; circuli very fine.

D. XII, 25, i to 28, i, last spine 1⅔ to 2⅛ in total head length, fifteenth ray 1⅖ to 1¾; A. III, 20, i or 21, i, third spine 1⅞ to 2½, thirteenth ray 1⅗ to 1⅘; least depth of caudal peduncle 3⅛ to 3⅖; caudal with hind edge slightly convex, 1½ to 1⅗; pectoral 1⅖ to 1¾; ventral 1¼ to 1¾.

Dull brownish generally, lighter below. Broad blackish-brown ocular band from middle of predorsal down to eye which equal in width, narrowing below down over cheek; with age an interorbital juncture forms leaving pale spot over eye medially and band much broader, extending over front of opercle. Blackish-brown crescent forms in young along soft dorsal base and over front of caudal peduncle, intersected vertically by pale bar or ill-defined band just before caudal peduncle and extending into bases of both soft dorsal and soft anal posteriorly; with age pale band disappears and dark crescent becomes perfected. From base of spinous dorsal and lower edge of dark crescent on soft dorsal about 18 or 19 dark lines extend down, following within from each lower and posterior edge of exposed body scales till little below level of pectoral. Iris dark brown. Edges of soft dorsal and soft anal pale, former with median rather obscure longitudinal brown line and parallel diffuse brown band little below middle. Caudal edge whitish and submarginal brown band, in front with slightly darker bordering line. Paired fins pale.

Red Sea, Zanzibar, Mauritius, East Indies, Polynesia, Hawaii. This is the largest of the genus, reaching upwards of 300 mm. We exclude *Chaetodon oxycephalus* Bleeker, by which author it was united as a variety of the present species.

8095. Alimango Bay, Burias Island. March 5, 1909. Length 270 mm.
8323. Bagacay Bay, Escarpada Island. March 13, 1909. Length 159 mm.
996. Bubuan Island. February 14, 1908. Length 86 mm.
9143. Cabugan Island, Leyte. July 29, 1909. Length 253 mm.
7782, 7783. Candaraman Island, Balabac. January 4, 1909. Length 170 to 203 mm.
5542. Cataingan, Masbate. April 17, 1908. Length 190 mm.
A1516. Daisy Islet, west of Bumbum Island. January 6, 1909. Length 212 mm.
160, 7590, 7606. Endeavor Strait. December 23, 1908. Length 148 to 202 mm.
190, 191. Langao Point, Luzon. June 24, 1909. Length 103 to 113 mm.
5968. Little Santa Cruz Island. May 26, 1908. Length 260 mm.
3887. Maculabo Island. June 14, 1909. Length 57 mm.
6200. Mansalay, Mindoro. June 4, 1908. Length 185 mm.
3899. Porongpong Island. June 11, 1909. Length 137 mm.
8017. Port Banalacan, Marinduque. February 23, 1909. Length 271 mm.
1173. Port Binanga. January 9, 1908. Length 132 mm.
4783. Quinalasag Island, Masamat Bay. June 12, 1909. Length 130 mm.
A565. Teomabal Island. September 18, 1909. Length 275 mm.
6653. Varadero Bay, Mindoro. July 23, 1908. Length 283 mm.
416. Great Tobea Island. December 15, 1909. Length 120 mm.
A860. Limbe Strait, Celebes. November 10, 1909. Length 275 mm.
43932 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 173 mm.
51064 U.S.N.M. Hawaii. 1901. Length 123 mm.
52718 U.S.N.M. Hawaii. 1901. Length 224 mm.
65453 U.S.N.M. Rikitea. *Albatross* collection. Length 227 mm.

CHAETODON OXYCEPHALUS Bleeker

Chaetodon oxycephalus Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. (596) 603. Ternate.
Tetragonoptrus (*Oxychaetodon*) *lineolatus* (part) Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 51 (Ternate).
Chaetodon lineolatus (part) Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 167 (New Pomerania, Talassia, New Guinea).

Depth $1\frac{3}{4}$ to $1\frac{4}{5}$; head $2\frac{4}{5}$, width $2\frac{2}{5}$ to $2\frac{3}{5}$. Snout $2\frac{1}{10}$ to $2\frac{2}{5}$ in head from snout tip; eye $3\frac{1}{4}$ to $4\frac{2}{5}$, $1\frac{2}{5}$ to $2\frac{1}{5}$ in snout, 1 to $1\frac{1}{5}$ in interorbital; maxillary reaches $\frac{2}{3}$ in snout, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; interorbital $3\frac{3}{5}$ to 4, broadly convex. Gill rakers $3+10$, short points, $4\frac{1}{2}$ in gill filaments, which $1\frac{1}{2}$ in eye.

Scales 25 to 28 between gill opening and caudal base; tubes 24 to 27 in lateral line; 6 scales above lateral line, 14 or 15 below. Scales with 9 to 15 basal radiating striae, with age many as 6 incomplete auxiliaries; apical denticles 108 to 248, with 17 to 19 transverse series of basal elements; circuli fine.

D. XII, 23, I or 24, I, last spine 1⅞ to 2 in total head length, twelfth ray 1⅗ to 1⅞; A. III, 19, I or 20, I, third spine 1⅞ to 2⅖, eleventh ray 1⅔ to 1⅞; least depth of caudal peduncle 3 to 3⅓; caudal 1⅖ to 1½, hind edge nearly truncate or slightly convex; pectoral 1⅕ to 1⅓; ventral 1⅕ to 1⅖.

Dull brownish generally, paler below. Broad blackish-brown ocular band from interorbital, wide as eye in young and becoming broader with age, scarcely narrowing on cheek. Lunar blackish-brown blotch on predorsal above occiput. Blackish-brown crescent along soft dorsal base and front of caudal peduncle, but not continued down on anal base, in young this blotch larger at front of soft dorsal. Along each hind and lower edge of body scales, following rows, oblique dusky line, about 17 to 20 in number; these extend from base of spinous dorsal and dark crescent of soft dorsal till little below level of pectoral. Iris dark brown. Brown band extends from near ends of last dorsal spines to bases of last soft rays, broadening little below, also 2 others, narrower extend more or less parallel on outer portion of same fin. Transverse dark band on last anal rays medially, also another at caudal base. Brownish subterminal band on caudal, edge of fin whitish and front of dark band with dark brown dividing line. Paired fins pale.

East Indies and Melanesia. This species is readily distinguished from *Chaetodon lineolatus* by its arrangement of the ocular band above which on predorsal is lunar dark blotch medially. Also the dark crescent at the soft dorsal base is not continued on the anal base; the presence of 3 dark lines on the soft dorsal and a dark band at the caudal base are other features of distinction.

8948. Between Paron and Jesus Points, Albay Gulf, Luzon. June 21, 1909. Length 190 mm.

342. Makesi Island. April 5, 1909. Length 145 mm.

8882. Near Palag Bay, Luzon. June 16, 1909. Length 195 mm.

736, 9225, 9226. Opol, Mindanao. August 4, 1909. Length 97 to 194 mm.

1164. Tataan, Simaluc Island. February 19, 1908. Length 105 mm.

One example. Philippines. Length 203 mm.

A1503. Birabirahan Island, Borneo. December 31, 1909. Length 160 to 172 mm. Two examples.

A1373. Basa Island, Celebes. December 17, 1909. Length 166 mm.

A914, A942, A943, A944. Dodepo and Pasejogo Islands. November 16, 1909. Length 171 to 178 mm.

416. Great Tobea Island. December 15, 1909. Length 123 mm.

A1139. Kayoa Island. November 29, 1909. Length 179 mm.

CHAETODON FALCULA Bloch

Chaetodon falcula Bloch, Naturg. Ausl. Fische, vol. 7, 1793, p. 102, pl. 325, fig. 2. No locality (Collection John); vol. 9, 1795, p. 102, pl. 405, fig. 2 (no locality).—Schneider, Syst. Ichth. Bloch, 1801, p. 225 (Tranquebar).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 41 (copied).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 17 (copied).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 151 (Coromandel; Mozambique).—Playfair, Fishes of Zanzibar, 1866, p. 33 (Zanzibar).—Capello, Jorn. Soc. Lisboa, 1871, p. 199 (Mozambique).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 39, pl. 27, fig. *e* (Paumotus, Society Islands, Hawaii, Samoa, Kingsmills).—Day, Fishes of India, pt. 1, 1875, p. 104, pl. 26, fig. 5 (Nicobars); Fauna Brit. India, vol. 2, 1889, p. 4.—Jatzow and Lentz, Abh. Senckenb. Naturf. Ges., vol. 21, Heft 1, 1897, p. 502 (Zanzibar).—Evermann and Seale, Bull. Bur. Fish., vol., 26, 1906, p. 96 (Bacon).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 170 (type; Mozambique, Mikindani).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Wake Island).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 612 (Mozambique).

Pomacentrus falcula Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 506, 511, 513.

Tetragonoptrus (*Oxychaetodon*) *falcula* Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 52, pl. (11) 373, fig. 1 (Batu, Ternate, Amboina).

Chaetodon ulietensis Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 39. Ulietea.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 18 (copied).—Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 152 (Ulietea).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 171 (Jaluit, Samoa).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 46 (Olongapo).

Chaetodon dizoster Valenciennes, Hist. Nat. Poiss., vol. 7, 1831, p. 527. Mauritius; Règne Animal Cuvier, Poiss. Ill., 1839, pl. 39, fig. 2.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 17 (copied).

Chaetodon aurora De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1885, p. 453. Queensland Coast.

Chaetodon ulietensis var. *confluens* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, p. 172. South Seas.

Depth 1½ to 1⅔; head 2⅔ to 2¾, width 2⅓ to 2⅖. Snout 2⅕ to 2½ in head; eye 3 to 4⅓, 1⅛ to 1⅞ in snout, little greater than interorbital in young to $1\frac{1}{10}$ with age; maxillary ½ to ⅗ in snout, 3⅕ to 3¼ in head; interorbital 3 to 4, broadly convex. Gill rakers 3+12, short points, ⅕ of gill filaments, which 1⅗ in eye.

Scales 28 to 30 between gill opening and caudal base; tubes 24 or 25 in lateral line; 6 scales above lateral line, 13 to 15 below. Scales with 8 to 13 basal radiating striae; apical denticles 88 to 160, with 10 to 14 series of transverse basal elements; circuli fine.

D. XII, 24, i or 25, i, last spine 1⅗ to 2⅙ in head, sixteenth soft ray 1⅔ to 2; A. III, 19, i to 21, i, third spine 1⅔ to 2, tenth ray 1⅔ to 2; least depth of caudal peduncle $3\frac{1}{10}$ to 3⅓; caudal convex behind, 1⅗ to 2; pectoral 1⅙ to 1⅖; ventral 1 to 1⅓.

Dull brown generally, paler below. Broad black band traverses eye vertically, narrowed above and uniting with its fellow at predorsal, broad below but not on chest. Broad vertical blackish brown band from front half of spinous dorsal down to level with pectoral. Another similar parallel band from last dorsal spines and front dorsal rays. On flanks scales below lateral line between and inclusive of dark blotches, with about 17 vertical dark brown lines inclined little forward and following subterminally within each row of scales. Blackish blotch on side of caudal peduncle, usually incomplete above. Edge of soft dorsal narrowly whitish and submarginal brown line. Soft anal with broad pale border, edge very narrowly brown and broad pale brown submarginal band, edged with dark brown. Caudal with whitish hind border, and narrow brown submarginal line. Paired fins pale.

Red Sea, Zanzibar, Mozambique, Mauritius, India, Nicobars, East Indies, Philippines, Riu Kiu, Melanesia, Micronesia, Polynesia. Greatly suggestive of *Chaetodon lineolatus* but smaller and with different color pattern. The young resemble the adults, only the dark transverse caudal line median on fin.

1252 to 1254. Atulayan Island. June 18, 1909. Length 115 to 116 mm.
1246. Candaraman Island. January 4, 1909. Length 70 mm.
250. Caxisigan. December 29, 1909. Length 133 mm.
1144. Cebu market. April 6, 1908. Length 103 mm.
1224, 4868. Galera Bay, Mindoro. June 9, 1908. Length 148 to 158 mm.
7271. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 128 mm.
1113. Little Santa Cruz Island. May 28, 1908. Length 155 mm.
3599 and 3600. Mompog Island. March 3, 1909. Length 146 to 150 mm.
1091. Murcielagos Bay. August 9, 1909. Length 133 mm.
393, 3601. Near Palag Bay, Luzon. June 16, 1909. Length 120 to 125 mm.
600. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 142 mm.
4723. Pilas Island. September 12, 1909. Length 135 mm.
1191. Port Dupon. March 17, 1909. Length 116 mm.
527, 711. Port Galera. June 9, 1908. Length 135 to 163 mm.
407, 408, 440. Port Palapag. June 3, 1909. Length 92 to 110 mm.
197. Simaluc Island. September 22, 1909. Length 152 mm.
A614. Singaan Island. September 21, 1909. Length 162 mm.
A1091. Maitara Island. November 26, 1909. Length 155 mm.
806. Tara Island. December 15, 1908. Length 128 mm. [794.]
880. Tataan, Simaluc Island. July 17, 1908. Length 135 mm.
237. Ulugan Bay, Palawan Island. December 29, 1908. Length 135 mm.
586. Sipadan Island. September 28, 1909. Length 125 mm.
473. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 122 mm.
4687, 4693. Apra Bay, Guam. November 19–20, 1907. Length 87 to 104 mm.
52452 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 92 to 130 mm. Three examples.
55959 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 125 mm. [3369].
65797 U.S.N.M. Makemo. *Albatross* collection, 1899. Length 128 to 133 mm. Four examples.
71666 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 168 mm.

CHAETODON MESOLEUCOS Forskål

Chaetodon mesoleucos Forskål, Descript. Animal., 1775, pp. xii, 61. Mochha Red Sea.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1266 (Arabia).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 56 (Moka).

Chaetodon mesoleucus Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 117, pl. 216, fig. 2 (Japan).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 411 (on Bloch).—Schneider, Syst. Ichth. Bloch, 1801, p. 227 (Indian Sea, Japan).—Rüppell, Neue Wirbelth., Fische, 1835, p. 29, pl. 9, fig. 1 (Djedda).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 28 (Red Sea).—Kaup, Arch. Naturg., vol. 28, abth. 1, 1860, p. 151.—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 782 (Red Sea).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 173 (Jedda at Mecca).

Chetodon mesoleucos Bonnaterre, Tabl. Ichth., 1788, p. 90 (Red Sea).

Holacanthus mesoleucos Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 528, 535 (Japan).

Chaetodon (Anisochaetodon) mesoleucus Klunzinger, Fische Roth. Meer., 1884, p. 57.

Chaetodon hodjan Schneider, Syst. Ichth. Bloch, 1801, p. 227. Arabia.—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 457, 484 (Arabia).

D. XIII, 22 or 23; A. III, 19. Front half of body with paired fins whitish, posterior half dark brown with fine darker vertical lines following scale courses. Dark ocular band narrower than eye and not extending below cheek.

Red Sea, Japan.

CHAETODON TRIANGULUM Cuvier

Chaetodon triangulum (Kuhl and Van Hasselt) Cuvier, Hist. Nat. Poiss. vol. 7, 1831, p. 44. Batavia.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 16 (North Celebes, Mysore).—Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, 1896, p. 312 (Andamans).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).—Weber, Siboga Exp., vol. 57, 1913, p. 308 (Banda).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 174 (Padang, Sipora).

Citharoedus triangulum Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 143 (Java, Africa).

Tetragonoptrus (Gonochaetodon) triangulum Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 53, pl. (12) 374, fig. 1 (Sumatra, Batu, Nias, Java, Flores, Solor, Timor, Halmaheira, Ternate, Obi major, Buru, Ceram, Amboina, Banda, New Guinea).

Gonochaetodon triangulum Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 33 (Philippines).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—McCulloch, Rec. Austral. Mus., vol. 15, No. 1, 1926, p. 36 (Pearl Reef, Queensland; Papua, New Hebrides, Solomons, New Britain).

Chaetodon (Gonochaetodon) triangulum Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 26, pl. 5, fig. 1 (Maricaban, Calapan, Capul, Gigantangan, Quiminatin, Balabac, Tubigan).

Chaetodon baronessa Cuvier, Hist. Nat. Poiss., vol. 7, 1931, p. 45 (on Vlaming, Renard, Valentyn).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 31 (Molucca Sea, Amboina, Ceram, Java).—Meyer, An. Soc. Española, Hist Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes).

Chaetodon triangulum, subspecies *baronessa* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 175, pl. 2, fig. 11 (Ralum, New Guinea, New Pomerania, Bougainville, Amboina).

Gonochaetodon baronessa Fowler, Proc. Acad. Nat. Sci. Phila., 1927, p. 287 (Philippines).

Chaetodon larvatus (Ehrenberg) Cuvier, Hist. Nat. Poiss. vol. 7, 1831, p. 45. Red Sea.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 31 (copied).—Playfair, Fishes of Zanzibar, 1866, p. 36 (Aden).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870 p. 108 (Red Sea).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 177 (Massuah).

Chaetodon (*Anisochaetodon*) *larvatus* Klunzinger, Fische Roth. Meer., 1884, p. 57.

Chaetodon karraf Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 46. Massuah.

Chaetodon (*Anisochaetodon*) *triangulum* var. *karraf* Klunzinger, Fische Roth. Meer., 1884, p. 57.

Chaetodon larvatus var. *karraf* Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 177 (Massaua).

Depth 1¼ to 1⅓; head 2⅔ to 3, width 2⅕ to 2½. Snout 2⅞ to 3 in head; eye 3 to 3⅖, 1 to 1⅙ in snout, greater than interorbital; maxillary ½ to ⅗ in snout, 3⅞ to 4¼ in head; interorbital 4 to 4½, convex. Gill rakers 5+11, short points, ⅛ of gill filaments, which 1⅔ in eye.

Scales 30 to 33 between gill opening and caudal base; tubes 17 to 19 in lateral line; 7 or 8 scales above lateral line, 18 or 19 below. Scales with 8 to 12 basal radiating striae, with 1 to 6 auxiliaries incomplete; apical denticles 82 to 142, transverse basal elements in 11 or 12 series; circuli fine.

D. XI, 22, i to 24, i, last spine 1¼ to 1½ in head, fourth ray 1 to 1⅛; A. III, 20, i or 21, i, third spine 1½ to 1¾, sixth ray 1¼ to 1⅓; least depth of caudal peduncle 2¾ to 3; caudal 1⅖ to 1½, hind edge straight; pectoral 1⅛ to 1⅕; ventral 1 to 1⅛.

Dark brown, paler or light brown over greater antero-median region. Head, predorsal and breast with 3 parallel bands of blackish-brown arched forward, median through eye, with 3 equally broad white bands separating. Sides with about a dozen parallel wide-angled lines, angle forming at median axis, posterior lines closer and becoming diffused in dark color of tail. Whitish transverse band across front of caudal peduncle, narrowing down across bases of last anal rays to point. Margins of soft dorsal, anal and caudal whitish, only extreme edge of soft dorsal dark or blackish; same fins all with submarginal line, though on caudal leaving broad gray and white edge, so in young dark transverse band median on fin. Caudal basally dark brown with median dark gray band before dark transverse one. Paired fins pale to whitish.

Red Sea, East Indies, Polynesia. A very deep species with dark coloration and many transverse lines. The color-pattern is quite constant.

793. Agojo Point, Catanduanes Island. June 10, 1909. Length 93 mm.

3, 1138, 1139, 1323. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 40 to 104 mm.

952, 1285, 4887. Alimango Bay, Burias Island. March 5, 1909. Length 97 to 102 mm.

921 and 10322. Balikias Bay, Lubang Island. July 17, 1908. Length 82 to 113 mm.

1195 and 1196. Bolalo Bay. December 21, 1908. Length 110 to 111 mm.

783. Bolinao. May 10, 1919. Length 106 mm.

752. Buang Bay, Talajit Island. March 15, 1909. Length 110 mm.

622. Bugsuk Island. January 5, 1909. Length 103 mm.

815, 816. Busin Harbor, Burias Island. April 23, 1909. Length 75 to 95 mm.

164, 165, 3628, 22792. Busin Harbor. March 8, 1909. Length 50 to 92 mm.

1236. Candaraman Island. January 4, 1909. Length 108 mm.

1124, 1125. Canimo Isand, near Daet. June 15, 1909. Length 110 to 111 mm.

11855. Caracaran, Batan Island. June 8, 1909. Length 90 mm.

9679. Caxisigan, off Balabac. January 2, 1909. Length 55 mm.

252, 253. Caxisigan. December 29, 1909. Length 96 to 109 mm. [1011].

3901, 4820. Cebu market. April 4, 1908. Length 94 to 99 mm.

1146. Cebu market. April 6, 1908. Length 100 mm.

546, 549. Daisy Island. January 6, 1910. Length 53 to 71 mm.

10417, 10424. East side of Verde Island. July 22, 1908. Length 93 to 98 mm.

1223, 4874, 4875, 19564. Galera Bay, Mindoro. June 9, 1908. Length 63 to 97 mm.

441. Galvaney, Luzon. March 9, 1909. Length 101 mm.

4612, 4613. Grande Island Reef, Subig Bay. January 8, 1908. Length 99 to 109 mm.

192, 803, 804. Langao Point, Luzon Island. June 24, 1909. Length 91 to 108 mm.

333, 334. Limbones Cove, Luzon Island. February 8, 1909. Length 101 to 105 mm.

1117, 4876. Little Santa Cruz Island. May 28, 1908. Length 104 to 116 mm.

646, 647. Lode Bay, Destacado. March 13, 1909. Length 107 to 114 mm.

3593. Mactan Island, Cebu. March 25, 1909. Length 93 mm.

1129. Mactan Cove. April 6, 1908. Length 68 mm.

7444. Maculabo Island. June 14, 1909. Length 116 mm.

5775. Mahinog, Camiguin Island. August 3, 1909. Length 75 mm.

3923, 3924. Malapascua Island. March 16, 1909. Length 67 to 71 mm.

529, 1011 to 1014. Mansalay, Mindoro. June 4, 1908. Length 88 to 121 mm.

901 to 904. Maricaban Island. January 20, 1908. Length 86 to 94 mm.

1083. Masbate Reef, Masbate. April 20, 1908. Length 96 mm.

990. Nasugbu, Luzon. January 16, 1908. Length 107 mm.

975, 3909. Pagapas Bay, Luzon. February 20, 1909. Length 81 to 87 mm.

375 to 377. Paluan Bay, Mindoro. December 11, 1908. Length 88 to 105 mm.

397, 398, 21018. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 97 to 100 mm.

1311 to 1313. Polloc. May 23, 1908. Length 86 to 100 mm.

9676. Porongpong Island, Palumbanes Group. June 10, 1909. Length 110 mm.

1176. Port Binanga. January 9, 1908. Length 84 mm.

1235. Port Dupon. March 17, 1909. Length 78 mm.

631, 970. Port Maricaban. July 21, 1908. Length 97 to 100 mm.

850, 851, 1018. Port Matalvi. November 22, 1908. Length 100 to 102 mm.

635 to 637. Port Tilig. July 15, 1908. Length 94 to 110 mm.

936. Pujada Bay. May 15, 1908. Length 71 mm.

214. Rapurapu Island. June 22, 1909. Length 98 mm.
1232. Sabtan Island. November 9, 1908. Length 110 mm.
693, 694. Sablayan, Mindoro. December 12, 1908. Length 100 to 103 mm.
4720. San Miguel Harbor, Tilao Island. April 21, 1908. Length 74 mm.
1179. Santa Cruz Island. April 24, 1908. Length 85 mm.
576. Surigao, Mindanao. May 8, 1908. Length 100 mm.
208. Taganak Island. January 1, 1909. Length 89 mm.
591. Tara Island. December 15, 1908. Length 111 mm.
1165. Tataan, Simaluc Island. February 19, 1908. Length 95 mm.
977 and 1064. Ligpo Point. January 1, 1908. Length 96 to 110 mm.
10447. Tilig, Lubang Island. July 14, 1908. Length 92 mm.
4738. Ulugan Bay, Palawan Island. December 28, 1908. Length 87 mm.
4762, 4763. Ulugan Bay, north Oyster Inlet. December 28, 1908. Length 116 to 117 mm.
963, 14011. West coast of Palaui Island. November 18, 1908. Length 83 to 105 mm.
21551. Tidore Island, south of Ternate. November 25, 1909. Length 55 mm.
30650 U.S.N.M. New Guinea. Australian Museum. Length 85 to 88 mm. Two examples.
32750 U.S.N.M. Indian Archipelago. Leiden Museum. Length 115 mm.

CHAETODON TRIFASCIALIS Quoy and Gaimard

Chaetodon trifascialis QUOY and GAIMARD, Voy. Uranie, Zool., 1825, p. 379, pl. 62, fig. 5. Guam.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 5 (copied).

Megaprotodon trifascialis JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 336, pl. 50, fig. 1 (Apia and Pago Pago).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).

Chaetodonton striganguli GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1269 (on BROUSSONET; plural form; inadmissible).

Chaetodon strigangulus (SOLANDER) CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 42, pl. 172. Tahiti.—LAY and BENNETT, Zool. Beechey's Voy., 1839, p. 60, pl. 17, fig. 2 (Tahiti and Byam Martin Island).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 4 (Amboina).—PLAYFAIR, Fishes of Zanzibar, 1865, p. 32 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 775 (Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4–5, Heft 6–7, 1874, p. 35 (Polynesia).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 308 (Banda).—AHL, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 179 (Jaluit, Samoa, South Sea, Mauritius, Zanzibar).

Chaetodon (*Megaprotodon*) *strigangulus* KLUNZINGER, Fische Roth. Meer., 1884, p. 56 (Koseir).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, September, 1927, p. 24, pl. 4, fig. 1 (Calapan and Tambagaan).

Megaprotodon strigangulus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 54 (Batu, Java, Celebes, Timor, Halmaheira, Obi, Amboina, Ceram, Banda).

Chaetodon triangularis RÜPPELL, Atlas Reis. nördl. Afrika, Fische, 1828, p. 42, pl. 9, fig. 3. Tor, Red Sea.

Eteira triangularis KAUP, Arch. Naturg., vol. 26, abth. 1, 1860, p. 147.

Chaetodon bifascialis CUVIER, Règne Animal, ed. 2, vol. 2, 1829, p. 190. Guam. (On *Chaetodon trifascialis* QUOY and GAIMARD.)

Megaprotodon bifascialis GUICHENOT, Rev. Zool., 1848, p. 12.

Chaetodon triangulum (not CUVIER 1831, p. 34) (REINWARDT) CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 44. Moluccas. (Name in text.)

Chaetodon leachii Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 49. No locality.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 6 (copied).
Chaetodon leachi Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 149.
Megaprotodon leachii Guichenot, Rev. Zool., 1848, p. 12.
Eteira taunayi Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 148 (on Quoy and Gaimard).
Coradion melanopus (not Cuvier) Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, pl. (13) 375, fig. 1 (not 4).

Depth $1\frac{4}{5}$ to $2\frac{1}{8}$; head 3 to $3\frac{1}{2}$, width $1\frac{3}{4}$ to $1\frac{7}{8}$. Snout 3 to $3\frac{2}{3}$ in head; eye $2\frac{4}{5}$ to $3\frac{2}{3}$, slightly longer than snout to equal with age, $1\frac{1}{10}$ to $1\frac{1}{4}$ in interorbital; maxillary $\frac{1}{2}$ to $\frac{3}{5}$ in snout, 4 to $4\frac{1}{4}$ in head; interorbital $2\frac{3}{4}$ to 3, broadly convex. Gill rakers 6+20, short points, $\frac{1}{8}$ of gill filaments, which $1\frac{1}{4}$ in eye.

Scales 34 or 35 between gill opening and caudal base; tubes 21 or 22 in lateral line; 8 scales above lateral line, 10 or 11 below. Scales with 8 to 12 basal radiating striae; apical denticles 83 to 100, with 4 to 9 transverse series of basal elements; circuli very fine.

D. XIV, 15, I or 16, I, last spine $1\frac{3}{5}$ to 2 in head, fifth ray $1\frac{1}{8}$ to 1 or little more; A. IV, 15, I or 16, I, fourth spine $1\frac{3}{5}$ to $1\frac{4}{5}$, seventh ray $1\frac{1}{4}$ to $1\frac{3}{5}$; least depth of caudal peduncle $2\frac{2}{3}$ to 3; caudal truncate or hind edge very slightly double concave, $1\frac{1}{4}$ to $1\frac{3}{5}$; pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$; ventral $1\frac{1}{8}$ to $1\frac{1}{3}$.

Back brown, with slight olive tinge, lower surface paler to whitish. On middle of side little above median axis, two elongate or horizontal pale blotches, first about as long as head and second a little shorter. About 20 oblique dusky lines on side of body, following medianly in rows of scales, on back obliquely forward till near median axis when all turn obliquely downward posteriorly. Broad blackish-brown band from predorsal, occasionally meeting its fellow, includes eye and down over cheek to chest; both front and hind edges with white bordering line. Soft dorsal and anal with narrow pale edges and blackish submarginal line. Caudal largely blackish-brown, upper and lower edges narrowly pale; hind edge narrowly white, then narrow blackish submarginal line and broad pale brownish band against dark color. Paired fins pale.

Red Sea, Zanzibar, Mauritius, East Indies, Micronesia, Polynesia. A rather oblong species, easily known by the presence of 4 anal spines and the dark ribbed color pattern of broad angled V-shaped marks on the side, all directed forward. We have not found any example with 5 anal spines as mentioned by Valenciennes and Bleeker.

1137. Alibijaban Island. March 6, 1909. Length 128 mm.
4888. Alimango Bay, Burias Island. March 5, 1909. Length 131 mm.
4845. Biri Channel. June 1, 1909. Length 91 mm.
9669. Biri Channel, Burias Island. June 2, 1909. Length 102 mm.
17059, 17060. Bisucay Island, near Cuyo. April 9, 1909. Length 108 to 114 mm.

3585. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 118 mm.

255 [1008]. Caxisigan. December 29, 1909. Length 105 mm. Black spots on scales not roundish but continued into bars. Light areas on lateral line rather below lateral line, scarcely wider than pupil; first entirely under, extends from angle of gill opening near middle of body; other behind first reaches across lateral line nearly to dorsal base. Soft dorsal below black inframarginal line bright orange merging gradually into dusky of base. Anal more nearly yellow. Third bar on caudal yellow, not transparent. Pectoral plain dusky. Ventral slightly yellow.

434. Cuyo Island. April 9, 1909. Length 116 mm.

1154. Hermana Mayor Island. May 8, 1909. Length 123 mm.

One example. Jolo Island, Jolo. March 7, 1908. Length 40 mm. 428. Sides silvery gray, crossed by narrow diagonal black bands. Breast and belly white, former with light yellow wash. Back with olive shades. Ocular bar nearly breadth of eye, beginning in front of dorsal, ending in spot on breast narrowly edged with pale. Forehead and snout with pale orange shades, interorbital with greenish. Behind white border of ocular band, dusky showing as half bar on opercle. Broad black band on soft dorsal and anal, bordered narrowly white on fins and dusky on caudal peduncle, latter beyond bright yellow including caudal base. Dorsal olive, small orange blotch on tips of spines in front of black bands. Anal yellow anteriorly, becoming somewhat olive at base, white border of black band continued forward on tips of soft rays and black line submarginal. Caudal hyaline terminally, separated from yellow base by narrow black band. Pectoral hyaline. Ventral bright yellow.

961. Langao Point. June 24, 1909. Length 83 mm.

978. Ligpo Point. June 18, 1908. Length 118 mm.

4877. Little Santa Cruz Island. May 28, 1908. Length 136 mm.

3613 to 3615. Maculabo Island. June 13, 1909. Length 137 to 146 mm.

914. Maculabo Island. June 14, 1909. Length 133 mm.

1172. Mahinog, Camiguin Island. August 3, 1909. Length 109 mm.

580. Matnog Bay. May 31, 1909. Length 82 mm.

4643. Port Binanga, Subig Bay. January 18, 1908. Length 115 mm.

10336, 10478. Port Maricaban. July 21, 1908. Length 89 to 97 mm.

412. Port Palapag. June 3, 1909. Length 103 mm.

7079. San Roque, Leyte Island. July 29, 1909. Length 128 mm.

1290, 22768. Sitanki Reef. September 24, 1909. Length 101 to 112 mm.

1136. Sulade Island. September 18, 1909. Length 128 mm.

4669. Tambul Sigambul, Tonquil Island. September 14, 1909. Length 130 mm.

900. Tapiantana. September 13, 1909. Length 124 mm.

10380. Tilig, Lubang Island. July 15, 1908. Length 113 mm.

37. Tunalutan Island. September 9, 1909. Length 123 mm.

13092. Kapoposang Island. December 28, 1909. Length 134 mm.

482, 483, 9876 Talisse Island. November 9, 1909. Length 100 to 131 mm.

471. Tomahu Island. December 12, 1909. Length 116 mm.

4823. Tidore Island, south of Ternate. November 24, 1909. Length 125 mm.

22967. Reefs in Apra Bay, Guam. November 19–21, 1907. Length 130 mm.

52325 U.S.N.M. Apia, Samoa. *Albatross* collection. Length 113 to 140 mm. Six examples.

65952 U.S.N.M. Fakarava. *Albatross* collection, 1899. Length 40 mm.

71606 U.S.N.M. Nafa, Okinawa, Riu Kiu. *Albatross* collection, 1906. Length 130 mm.

Genus HEMITAURICHTHYS Bleeker

Hemitaurichthys Bleeker, Arch. Néerland. Sci. Nat., vol. 11, 1876, p. 304. Type *Chaetodon polylepis* Bleeker, monotypic.

Differs from *Chaetodon* chiefly in its small scales and teeth and fewer dorsal rays.

ANALYSIS OF THE SPECIES

a^1. Yellow, with head and occiput lavender, also large triangular lavender blotch on back with angle at last dorsal spines------------------------------**zoster**
a^2. Uniform neutral dusky, especially fins terminally---------------**thompsoni**

HEMITAURICHTHYS ZOSTER (Bennett)

Chaetodon zoster Bennett, Proc. Comm. Zool. Soc. London, vol. 1, 1831, p. 61. Mauritius.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 33 (copied).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 437 (Mauritius).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 38, pl. 2, fig. 7 (New Guinea, Mauritius).

Chaetodon polylepis Bleeker, Act. Soc. Sci. Ind. Néerland., vol. 2, No. 2, 1857, p. (4) 54. Amboina.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 35 (no locality).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 488 (Luzon, Manila).

Hemitaurichthys polylepis Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 31, pl. (14) 378, fig. 4 (Amboina and Timor).—Fowler, Occ. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 384 (Honolulu).—Herre and Montalban, Philippine Journ. Sci., vol. 34 No. 1, September, 1927, p. 73 (Quiminatin Island).

Depth 1⅖ to 1⅔; head 3 to 3⅓, width 1⅘ to 2⅛. Snout 2⅔ to 3⅒ in head from snout tip; eye 3 to 3⅕, 1 to 1⅕ in snout, 1 to 1¼ in interorbital; maxillary ⅖ to ½ in snout, 4 to 4⅛ in head; interorbital 2⅞ to 3⅛, broadly convex. Gill rakers 3 + 9 short points, ⅙ of gill filaments, which 1¼ in eye.

Scales 48 to 56 between gill opening and caudal base; tubes 56 to 63 in lateral line to caudal base; 14 scales above lateral line, 32 or 33 below. Scales with 7 to 9 basal radiating striae; apical denticles 48 to 52 with 4 to 6 transverse series of basal elements; circuli fine.

D. XI or XII, 24, i or 25, i, last spine 1½ to 1⅞ in total head length, eight ray 1½ to 1¾; A. III, 21, i, last spine 1⅖ to 1¾, eighth ray 1⅔ to 1⅘; least depth of caudal peduncle 2¾ to 3; caudal 1½ to 1⅔, hind edge slightly convex; pectoral 2⅘ to 2⅞ in combined head and body; ventral 2¾ to 3.

Head, breast, front of back and most of spinous dorsal over anterior ⅔ at least, brown. Soft dorsal and back adjacent and down to lateral line also brown, likewise most of anal and caudal. Rest of body, especially side, with angular area up, below last dorsal spines grayish brown. Paired fins dull brownish, more deeply brownish on ventrals submarginally. Iris brownish.

Mauritius, East Indies, Hawaii. It is quite evident *Chaetodon zoster* Bennett is the earliest name available for this species. Though very briefly described, the account agrees.

8461. Cagayan Island. March 31, 1909. Length 156 mm. Head from behind base of front dorsal spine downward to near ventral base dark, nearly blackish, becoming brownish on lower head and breast, with slight olive shade above. Triangular area from behind third dorsal spine to front of ninth and pointing below till above pectoral base orange. Soft dorsal and anal orange, leaving dusky silvery of side nearly an equilateral triangle above auxillary line of side; not separated from same color below, which includes all of caudal peduncle and caudal fin. Orange includes all dorsal spines except first 3 and all 3 anal spines; orange shades brilliant in life, become dusky after death, and sides appear white or clear silvery in life. Paired fins dusky. Pectorals somewhat darker on upper base.

72. Caxisigan Island, off Balabac. January 2, 1909. Length 132 mm.

A1141. Kayoa Island. November 29, 1909. Length 150 mm.

4789 to 4798. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 132 to 151 mm.

460 and 461. Basa Island. December 7, 1909. Length 144 to 145 mm.

4764 to 4766. West of Malibagu Point, Celebes. November 21, 1909. Length 117 to 140 mm. Middle of side with large white or silvery gray area, not brown as shown by Bleeker. Upper portion above lateral line especially shows dusky margins and slight duskiness in central portion of scales but not red brown of Bleeker; anterior body and upper portion of head seal brown, shade beginning about base of third dorsal spine, thence downward to point of opercle and obscurely across breast slightly before ventrals; close behind dusky cadmium orange to line of demarcation with white which begins at base of eighth spine; lower side of head and breast distinctly yellowish, margins of scales brown. Lips and top of snout dark brown. Posterior portion of white limited by curve from tenth dorsal spine to top of caudal peduncle, touching lateral line opposite lower ⅖ of dorsal; fins above cadmium yellow, becoming more or less dusky at tips. Caudal peduncle and caudal included in white, fin dusky hyaline on posterior third. Anal spines and terminal portion of fin beyond line from middle of last ray to base of second spinous membrane on its outer edge cadmium yellow. Paired fins dusky hyaline, pectoral darkest on upper rays, slightly yellowish or brownish in upper axil and on upper outer base. [2064].

HEMITAURICHTHYS THOMPSONI Fowler

Hemitaurichthys thompsoni Fowler, Occas. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 384. Honolulu.

Differs from *Hemitaurichthys zoster* chiefly in its uniform or dusky coloration.

Genus MICROCANTHUS Swainson

Microcanthus Swainson, Nat. Hist. Anim., vol. 2, 1839, p. 215. Type *Chaetodon strigatus* (Langsdorf) Cuvier, monotypic.

Therapaina Kaup, Arch. Naturg., vol. 26, abth. 1, 1860, p. 140. Type *Chaetodon strigatus* (Langsdorf) Cuvier, monotypic.

Neochaetodon Castelnau, Proc. Zool. Soc. Victoria, vol. 2, 1873, p. 130. Type *Neochaetodon vittatus* Castelnau monotypic.

Like *Hemitaurichthys,* differs from *Chaetodon* in its small scales, though its soft dorsal and anal are greatly shorter than either. Pale, with horizontal blackish bands.

MICROCANTHUS STRIGATUS (Cuvier)

Chaetodon strigatus (Langsdorf) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 25 pl. 170. Japan.—Schlegel, Fauna Japon., Poiss., dec. 5–6, 1844, p. 1844, p. 80, pl. 41, fig. 1 (Nagasaki).—Richardson, Ichth. China Japan, 1846, p. 246 (Canton).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 30 (China, Japan); Journ. Mus. Godeffroy Cat., vol. 5, 1874, p. 24 (Australia).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Nagasaki Bay).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 488 (Luzon, Cavite).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 52.—Waite, Rec. Austral. Mus., vol. 4, 1901, p. 189 (Pinjarrah, Western Australia).

Microcanthus strigatus Swainson, Nat. Hist. Anim., vol. 2, 1839, p. 215.—Ogilby, Mem. Austral. Mus., vol. 2, 1889, p. 55 (Lord Howe Island).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 541 (Wakanoura, Tokyo, Misaki, Nagasaki).—Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 357 (Formosa).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 422 (Misaki), p. 510 (Okinawa).—Seale, Philippine Journ. Sci., vol. 9, No. 1, 1914, p. 73 (Hong Kong).—McCulloch, Biol. Res. Endeavour, vol. 4, pt.4, Oct. 31, 1916, p. 193 (Wide Bay, Queensland); Austral. Zoologist, vol. 2, pt. 3, February 10, 1922, p. 91, pl. 27, fig. 234*a* (New South Wales).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 22 (type; Nagasaki).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 72, pl. 18, fig. 1 (Amoy and Hong Kong).

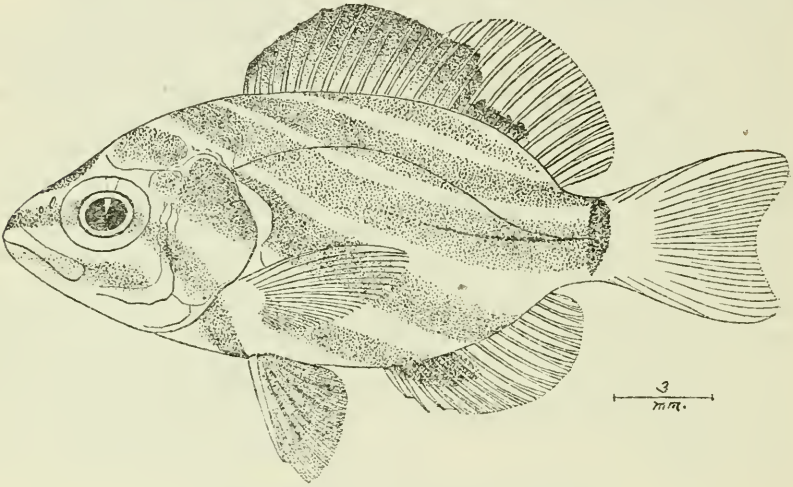

Fig. 7.—Microcanthus Strigatus Cuvier, Young

Neochaetodon vittatus Castelnau, Proc. Zool. Soc. Victoria, vol. 2, 1873, p. 130. Victoria.—Castelnau, Proc. Linn. Soc. New South Wales, vol. 3, 1879, p. 375 (Port Jackson).

Depth 1⅔ to 1⅘; head 3 to 3¼, width 1⅞ to 2. Snout 3⅓ to 4 in head; eye 2½ to 3⅕, greater than snout in young to equal in length with age, much greater than interorbital at all ages; maxillary reaches opposite front nostril in young, to eye with age, $3\frac{3}{5}$ to $3\frac{4}{5}$ in head; interorbital $3\frac{1}{5}$ to $3\frac{1}{3}$, broadly or but slightly convex. Gill rakers 6 + 14, lanceolate, 2 in gill filaments, which 2 in eye.

Scales 42 to 45 in lateral line to caudal base, and 2 or 3 more tubular on latter; 12 or 13 scales above lateral line, 22 to 27 below. Scales with 7 or 8 basal radiating striae; apical denticles 56 to 62, with 4 to 9 transverse series of basal elements; circuli fine.

D. XI, 16, I or 17, I, fourth spine $1\frac{3}{5}$ to $1\frac{3}{4}$ in head, fourth ray $1\frac{7}{8}$ to $2\frac{1}{8}$; A. III, 13, I or 14, I, second spine $1\frac{1}{2}$ to $1\frac{3}{5}$, second ray $1\frac{3}{4}$ to $1\frac{4}{5}$; least depth of caudal peduncle $2\frac{1}{8}$ to $2\frac{1}{2}$; caudal emarginate, 1 to $1\frac{1}{5}$; pectoral $1\frac{1}{5}$ to $1\frac{2}{5}$; ventral $1\frac{1}{5}$ to $1\frac{2}{5}$.

Ground color largely pale to white. Six broad blackish-brown bands, sloping slightly downwards or posteriorly from horizontal, on head and back broader than pale interspaces. Two uppermost bands also extend across soft dorsal and anal, though spinous dorsal with broad black band which also extends across front of soft dorsal. Caudal and pectoral pale. Ventral pale, with second and third rays dusky.

China, Japan, Philippines?, Riu Kiu, Australia.

Our specimens all agree, but differ from McCulloch's figure,[5] which shows the ocular band sloping to the pectoral origin above the eye and not through it as in both our Port Jackson specimens. Moreover these also do not show a black anal base as he indicates.

4711. Hong Kong market, China. August 13, 1908. Length 80 mm.

47828 U.S.N.M. Port Jackson, New South Wales. Australian Museum. Two examples. Length 138 mm.

50756 U.S.N.M. Tokyo, Japan. Jordan and Snyder. Length 19 to 145? mm. Eleven examples.

53540 U.S.N.M. Myanoura, Yakashima. Anderson Collection. Length 34 mm.

55549 U.S.N.M. Hawaii. Length 105 to 145 mm. Two examples.

57725 U.S.N.M. Japan. P. L. Jouy. Length 105 to 135 mm. Two examples.

71684 U.S.N.M. Naha, Okinawa, Riu Kiu. *Albatross* collection. Three examples. Length 96 to 103 mm.

82872 U.S.N.M. Oahu. Wilkes Exploring Expedition. Length 90 to 123 mm. Three examples.

Genus VINCULUM McCulloch

Vinculum McCulloch, Biol. Res. Endeavour, vol. 2, pt. 3, 1914, p. 110. Type *Chaetodon sexfasciatus* Richardson, monotypic.

Paracoradion Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, pp. 47, 107. Type *Chaetodon ocellipinnis* Macleay, monotypic.

Differs from *Microcanthus* largely in its minute scales, more than 70. Likewise its color pattern entirely different, the body marked with vertical bands.

---

[5] Australian Zoologist, vol. 2, pt. 3, Feb. 10, 1922, p. 91, pl. 27, fig. 234*a*.

VINCULUM SEXFASCIATUS (Richardson)

Chaetodon sexfasciatus Richardson, Ann. Mag. Nat. Hist., London, vol. 10, 1842, p. 26. West Australia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 35 (type).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 60, abth. 1, 1879, p. 360 (King George Sound).

Vinculum sexfasciatum McCulloch, Biol. Res. Endeavour, vol. 2, pt. 2, 1914, p. 110, pl. 22 (Doubtful Island Bay, West Australia); Austral. Zoologist, vol. 2, pt. 3, 1922, p. 91, pl. 27 (New South Wales).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 21 (Southwest Australia).

Chaetodon ocellipinnis Macleay, Proc. Linn. Soc. New South Wales, vol. 3, 1878, p. 33, pl. 3, fig. 1. King George's Sound.

Vinculum ocellipinnis McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, 1916, p. 193 (note on type).

Snout shorter than eye. Preopercle strongly serrate. D. X, 23; A. III, 19. Scales 50. Six black vertical bands; first through eye from occiput and on breast to ventral; second from predorsal; third from spinous dorsal medially; fourth from soft dorsal front to anal; fifth from soft dorsal posteriorly to anal posteriorly; sixth on caudal peduncle posteriorly. Large black, white-edged ocellus on soft dorsal front and another on anal front. Length 83 mm. (Macleay.)

Genus HENIOCHUS Cuvier

Heniochus Cuvier, Règne Animal, vol. 2, 1817, p. 335. Type *Chaetodon macrolepidotus* Linnaeus, designated by Jordan and Evermann, Genera of Fishes, vol. 1, 1917, p. 105 (not versus *Henioche* Hübner, 1916 in Lepidoptera).

Taurichthys Cuvier, Règne Animal, vol. 2, ed. 2, 1829, p. 192. Type *Taurichthys varius* Cuvier, designated by Bleeker, Arch. Néerland. Sci. Nat., vol. 11, 1876, p. 304.

Diphreutes Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1141. Type *Chaetodon macrolepidotus* Linnaeus, monotypic.

Loa (not Stiles 1902) Jordan, Proc. U. S. Nat. Mus., vol. 59, 1922, p. 652. Type *Loa excelsa* Jordan, orthotypic.

Roa Jordan, Copeia, No. 118, May 20, 1923, p. 63. Type *Loa excelsa* Jordan, virtually (as *Roa* proposed to replace *Loa*).

Body greatly compressed, well elevated. Muzzle short. No teeth on palate. Forehead often with bony or hornlike projections with age. Preopercle without spine. Scales moderate. Dorsal spines 11 to 13, fourth greatly elevated and filiform. Differs from *Chaetodon* and related genera chiefly in its elongated fourth dorsal spine.

ANALYSIS OF THE SPECIES

a^1. Taurichthys. Fourth dorsal spine not prolonged in filament long as entire fish; body with 2 to 4 dark transverse bands, variably broad, never as 2 median similarly broad and sharply defined.
  b^1. Body with greater median portion, including ventrals and anal dark; head and front uniformly dark, separated from body by pale transverse band from front of dorsal to breast.................................... varius
  b^2. Body with 3 or 4 dark transverse bands.
    c^1. Body with 3 dark well defined transverse bands.
      d^1. Dark bands transverse, first from front of spinous dorsal to chin, second from spinous dorsal medially to belly includes ventral, third from bases of last dorsal spines to last half of soft anal.......... monoceros

d^2. Dark bands more inclined, first from first dorsal spine to eye then to belly includes ventral, second from fourth dorsal spine to middle of anal and third from last dorsal spines along back and as blotch on caudal peduncle posteriorly---------------------------------**permutatus**

c^3. First dark band across muzzle, second from interorbital down over cheek to chin, third from front of spinous dorsal to belly includes ventral and hind border diffuse, and fourth diffuse oblique band along soft dorsal base. **singularis**

a^2. Heniochus. Fourth dorsal spine prolonged filament at least long as body; 2 black transverse bands, first from front of spinous dorsal to belly includes ventral and second from last dorsal spines to last half of anal.-----**acuminatus**

HENIOCHUS VARIUS (Cuvier)

Taurichthys varius Cuvier, Règne Animal, vol. 2, 1829, p. 192. East Indies (On Renard, Poiss. Moluqües, vol. 1, 1718, pl. 30, fig. 164; vol. 2, pl. 10, fig. 49).—Valenciennes, Règne Animal Cuvier, Poiss., Ill., 1839, pl. 41, fig. 2.—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 27, pl. (3) 365, fig. 2 (Batu, Java, Celebes, Timor, Amboina, Ceram, Banda).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 97 (Bacon).

Heniochus varius Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 41 (Molucca Sea and Amboina).—Kner, Reise Novara, Fische, 1865, p. 103 (no locality).—Günther, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—Meyer, An. Soc. Española Hist. Nat., Madrid, vol. 14, 1885, p. 17 (Macassar, Celebes).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft. 5, 1923, p. 24 (Mysol, New Guinea, Talassia, New Pomerania, Tilenius Harbor, Ralum).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 79, pl. 20, fig. 2 (Batangas, Calapan, Bulalacao Bay, Guindulman, Cagayan de Misamis).

Hemiochus varius Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).

Heniochus (*Taurichthys*) *varius* Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 420 (Ternate).

Taurichthys viridis Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 114. Amboina.

Taurichthys bleekeri Castelnau, Res. Fish. Australia (Victoria Rec. Philadelphia Exhib.), 1875, p. 15. Cape York, Queensland.

Heniochus pleurotania Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 24, pl. 1, fig. 5. Padang, Sumatra.

Depth 1¼ to 1⅓; head 2¾ to 2⅘, width 1⅞ to 2⅛. Snout 2⅖ to 3 in head; eye 2¾ to 3⅓, little greater to 1⅖ in snout, little greater than interorbital in young to equal with age; maxillary 4⅛ to 4⅘ in head, extends ½ to ⅔ in snout; interorbital 3⅕ to 4, broadly convex; with age strong horny or antler-like spine above each eye, variously curved, bifid and about long as eye, frequently asymmetrical; occiput with horny, conic point, more developed and directed forward with age. Gill rakers 3 + 15, short points ⅒ of gill filaments, which 1¾ in eye.

Tubes 40 to 45 in lateral line to caudal base; 10 or 11 scales above lateral line, 26 or 27 below. Scales with 8 to 10 basal radiating striae; apical denticles 58 to 91, with 5 to 7 transverse series of basal elements; circuli fine.

D. X to XII, 21, I to 24, I, fourth spine 1⅔ to 3¼ in combined head and body, fourth ray 1¼ to 1⅓ in head; A. III, 17, I or 18, I, last spine 1⅖ to 2, fourth ray 1⅒ to 1⅕; least depth of caudal peduncle 2⅞ to 3⅛; caudal 1⅙ to 1⅓, hind edge little emarginate, to slightly convex when expanded; pectoral 2 to 2½ in combined head and body; ventral 2⅖ to 2⅘.

Body largely blackish-brown, especially medially. Rather diffuse pale or whitish band from front of spinous dorsal to opercle and breast. Another, more sharply defined, broadly from last dorsal spines down obliquely across caudal peduncle. Outer portion of soft dorsal dull brownish and caudal paler. Spinous dorsal and anal more or less blackish, except pale band on former. Pectoral dull or olive-brown. Ventrals blackish. Iris brown.

East Indies, Philippines, Queensland, Melanesia, Polynesia.

8150. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 160 mm.
578, 1286, 1287. Alimango Bay. March 5, 1909. Length 88 to 114 mm.
17751. Balikias Bay, Lubang Island. July 17, 1908. Length 120 mm.
4822. Batan Island. June 5, 1909. Length 98 mm.
8957. Between Paron and Jesus Points, Albay Gulf, Luzon. June 21, 1909. Length 152 mm.
8559. Bolinao. May 10, 1909. Length 175 mm.
8351. Buang Bay, Talajit Island. March 15, 1909. Two examples. Length 160 to 171 mm.
5640, 5668, 5676, 5679. Busin Harbor, Burias Island. April 22, 1908. Length 160 to 175 mm.
819, 868, 1156. Busin Harbor. April 23, 1908. Length 82 to 104 mm.
3630. Busin Harbor. March 8, 1909. Length 107 mm.
8371. Caracaran, Batan Island. June 8, 1909. Length 170 mm.
5352. Cebu market. April 4, 1908. Length 131 mm.
7555, 7556. Endeavor Strait. December 23, 1908. Length 168 to 190 mm.
8244 to 8251. Galvaney, Ragay Gulf, Luzon. March 9, 1909. Length 156 to 171 mm.
5197. Jolo market. March 7, 1908. Length 165 mm.
509. Langao Point. June 21, 1909. Length 128 mm.
4750. Ligpo Point, Balayan Bay, Luzon. January 18, 1908. Length 90 mm.
8448. Mactan Island, Cebu. March 25, 1909. Length 170 mm.
8881. Mansalay, Mindoro. June 4, 1908. Length 131 mm.
3892. Maribojoc Bay, Bohol. March 26, 1909. Length 77 mm.
910. Maricaban Island. January 20, 1908. Length 66 mm.
8598. Matnog Bay. May 31, 1909. Length 150 mm.
6242. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 125 mm.
719 and 8898. Near Palag Bay. June 16, 1909. Length 150 to 167 mm.
7944, 7981. Pagapas Bay, Luzon. February 20, 1909. Length 163 to 175 mm.
1317. Polloc. May 23, 1909. Length 134 mm.
8207. Port Busin, Burias Island. March 8, 1909. Length 170 mm.
5763. Port Capunuypugan, Mindanao. May 10, 1908. Length 186 mm.
8388. Port Dupon, Leyte. March 17, 1909. Length 157 mm.
8271. Port Jamelo, Luzon. July 13, 1908. Length 85 mm.
6558, 6559. Port Maricaban. July 21, 1908. Length 155 to 160 mm.
4780. Port Matalvi. November 22, 1908. Length 121 mm.
4787. Port Matalvi. November 23, 1908. Length 107 mm.
723. Port Palapag. June 3, 1909. Length 108 mm.
8272. San Miguel Island, Tabaco Bay. June 4, 1909. Length 111 mm.
5693. Santa Cruz, Marinduque. April 24, 1908. Length 165 mm.

1167, 4912. Tataan Bay, Simaluc Island. Length 114 to 143 mm. Slaty black below merging into greenish umber above. Pale bar, including first 3 dorsal spines, passes across opercle, covers breast and lower head except black chin. Preocular edged with very pale slate, forehead and snout otherwise black. Oblique white bar begins on tip of first dorsal spine, crosses base of soft dorsal to include caudal peduncle; vertical anal edge beyond narrowly bordered white; soft dorsal beyond stripe yellowish olive green, membranes hyaline terminally, very narrowly edged with greenish black. Caudal similar to soft dorsal only paler. Anal and ventral slaty black. Pectoral dusky hyaline basally. Iris very dark.

1002, 1003. Tataan. February 20, 1908. Length 118 to 125 mm.

4965. Tataan, on reef. February 21, 1908. Length 140 mm.

5830. Tataibada Point. May 15, 1908. Length 165 mm.

6491. Tilig, Lubang Island. July 15, 1908. Length 151 mm.

6641, 6666. Varadero Bay, Mindoro. July 23, 1908. Length 176 to 182 mm.

A862. Limbe Strait, Celebes. November 10, 1909. Length 153 mm.

3908. Una Una Road, Binang Unang, Celebes. November 17, 1909. Length 87 mm.

7976. Talisse Island. November 9, 1909. Length 133 mm.

21501. Gane Road, Gillolo Island. December 7, 1909. Length 50 mm.

4715. Tidore Island, south of Ternate. November 25, 1909. Length 75 mm.

47778 U.S.N.M. New Guinea. Australian Museum. Length 148 to 150 mm. Two examples.

52515 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 103 mm.

55939 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 145 mm. [3336].

HENIOCHUS MONOCEROS Cuvier

Heniochus monoceros Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 100. Mauritius.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 41 (type); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 49, pl. 38 (Samoa and Tahiti).—Ahl, Arch. Naturg., vol. 89, abth. A, Heft 5, 1923, p. 29 (Samoa and Mauritius).

Taurichthys monoceros Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 28, pl. (3) 365, fig. 3 (Java).

Loa excelsa Jordan, Proc. U. S. Nat. Mus., vol. 59, 1921, p. 652, fig. 6. Hawaii (young).

Depth 1⅓ to 2⅖; head 2⅞ to 3⅛, width 2⅕ to 2⅓. Snout 2⅖ to 3⅖ in head; eye 3⅛ to 3⅗, 1⅓ to 1½ in snout, little greater than interorbital; maxillary ⅗ to ⅔ in snout, 4 to 4⅔ in head; interorbital 3⅕ to 3⅞, slightly convex; with age small horny spine developed over upper front eye edge, strong, not longer than pupil; occiput with horny tubercle like spine, though much less developed than in *Heniochus varius*. Gill rakers 5 + 13, short points, about $\frac{1}{10}$ of gill filaments, which 1⅛ in eye.

Tubes 55 to 58 in lateral line to caudal base; 11 or 12 scales above lateral line, 27 or 28 below. Scales with 10 to 12 basal radiating striae; apical denticles 75 to 90, with 10 to 33 transverse series of basal elements; circuli fine.

D. XII, 23, i to 26, i, fourth spine elongated, 1⅗ to 2 in combined head and body, fourth ray 1⅓ to 1⅖ in head; A. III, 18, i or 19, i, third spine $1\frac{2}{5}$ to $1\frac{5}{6}$, fourth ray $1\frac{1}{5}$ to $1\frac{1}{4}$; least depth of caudal peduncle $2\frac{2}{3}$ to 3; caudal truncate to slightly emarginate, slightly convex as expanded, $1\frac{2}{5}$ to $1\frac{3}{5}$; pectoral 1 to $1\frac{1}{10}$; ventral 1 to $1\frac{1}{5}$.

Very pale brownish generally. Broad brown band includes predorsal, eyes, muzzle and chin; broken with pale loop up from nostrils to middle of interorbital and down on other side; pale transverse band across occiput below supraocular tubercle to upper eye edge. Second broad blackish-brown band from middle of spinous dorsal down to include pectoral base and most of post ventral space. Third transverse band obliquely from hind part of soft dorsal obliquely across tail to posterior half of anal. Anal narrowly bordered blackish. Pectoral pale or whitish. Ventral black.

Mauritius, East Indies, Riu Kiu, Polynesia. An examination of the type of *Loa excelsa* and a comparison with the figures published and purporting to represent it are worthy of some comment. Apparently *Heniochus macrolepidotus* (not Linnaeus) Brevoort,[6] represents an example 44 mm. long. In a general way it differs in that its depth is shown as 2 (*Loa excelsa* with $1\frac{1}{2}$), fourth dorsal spine longest (*Loa excelsa* with third longest), dark ocular band extends along hind eye edge to cheek (crosses eye medially in *Loa excelsa*), only one transverse black band in the body though begins at longest dorsal spine and reaches breast before ventral origin. We feel convinced, however, that Brevoort's figure represents inaccurately his specimen. The absence of the dorsal ocellus and the broad dark vertical band across the tail from the last dorsal spines and soft dorsal to the hind part of the anal, may well have faded from his specimen. Brevoort is careful to state that "the second black band does not touch the opercle and the third unites with the second under the spinous dorsal," the latter statement evidently an error? Brevoort gives the dorsal as X, 24.

Bleeker's figure is from an example 90 mm. long from Java, but it is given with D. XII, 28; A. III, 19. It is shown without the dark transverse bands, but his description of them agrees with *Loa excelsa.* As the ocellus is not mentioned it had probably disappeared. The figures by Cuvier and Günther show the adult, in which the fourth dorsal spine is greatly lengthened.

1327. Calangaman Island. March 16, 1909. Length 173 mm.

6912, 6913. Santo Domingo, Batan. November 7, 1908. Length 225 and 226 mm.

5024. South Toumindao, lagoon anchorage. February 26, 1908. Length 170 mm.

84094 U.S.N.M. Hawaii. T. Reinhardt. Length 47 mm.; dried example. Type of *Loa excelsa.*

65530 U.S.N.M. Rikitea, Mangareva. *Albatross* collection. Length 150 mm.

---

[6] Notes Japanese Fishes, 1856, p. 267, pl. 6, fig. 2. "Lew Chew."

HENIOCHUS PERMUTATUS Cuvier

Heniochus permutatus (E. Bennett) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 99. No locality (Collection Zool. Soc. of London).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 80, pl. 22, fig. 2 (Romblon, Tubigan, Bungau).

Heniochus chrysostomus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 99. Tahiti.—Valenciennes, Règne Animal, Poiss., Ill., 1839, pl. 40, fig. 2.—Lay and Bennett, Zool. Beechey's Voy., 1839, p. 62, pl. 18, fig. 1 (Tahiti).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 49, pl. 39, fig. A (Paumotus and Society Islands).—Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 102, Heft 1, 1893, p. 226, pl. 2, fig. 1 (Tjilatjap, Java).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 310 (Saleyer).—Cockerel, Mem. Queensland Mus., vol. 3, 1915, p. 44 (Queensland).—Ahl, Arch. Naturg., vol. 89, abth A, Heft 5, 1923, p. 30 (Ralum, Thilenius Harbor, New Guinea, Samoa, Madras).

Heniochus chrysostoma Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 41 (Amboina).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 489 (Luzon, Manila).

Chaetodon chrysostomus (Parkinson) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 99. Tahiti (name in synonymy).

Taurichthys chrysostomus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 29, pl. (4) 366, fig. 2 (Flores, Ternate, Ceram, Amboina, Banda, Goram, New Guinea).

Heniochus melanistion Bleeker, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 98. Banda, Neira.

Heniochus drepanoides Thiollière, Fauna Woodlark, 1857, p. 166. Woodlark Island.

Drepane cocher (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 166 (name in synonymy).

Depth 1⅓ to 1⅖; head 2¾ to 2⅘, width 2 to 2⅛. Snout 2⅘ to 3 in head; eye 2⅞ to 3⅓, 1⅛ to 1⅙ in snout, greater than interorbital in young to equal to interorbital with age; maxillary ½ to ⅗ in snout, 5 to 5⅖ in head. Interorbital 3¾ to 4, broadly and slightly convex; with age strong, short, variably simple or bifid supraorbital spine, greatly shorter than pupil. Gill rakers 3 + 12, short points, about ⅒ of gill filaments, which 1⅗ in eye.

Tubes 47 to 54 in lateral line to caudal base; 10 or 11 scales above lateral line, 24 to 26 below. Scales with 9 to 15 basal radiating striae; apical denticles 68 to 90, with 6 to 10 transverse series of basal elements; circuli fine.

D. XII, 21, I or 22, I, fourth spine 1 to 2⅕ in combined head and body, second ray 1¼ to 1⅖ in head; A. III, 17, I to 19, I, third spine 1¼ to 1½, fourth ray 2⅗ to 3¼; least depth of caudal peduncle 3 to 3⅕; caudal truncate, slightly convex as expanded, 1⅖ to 1½; pectoral 2½ to 2¾ in combined head and body; ventral 2⅗ to 3.

Pale to whitish generally. Broad blackish-brown oblique band from eye and predorsal to most of post-ventral region, including pectoral base. Muzzle, interorbital and occipital region pale or whitish, with blackish median streak at snout tip. Second broad blackish band from fourth and fifth dorsal spines obliquely to include posterior half of soft anal, which in young with median black ocellus large as eye. Rather diffuse brown oblique band along soft dorsal base and reflected as dark triangular blotch on caudal basally above. Ventrals black. Pectoral whitish. Iris brown.

East Indies, Queensland, Melanesia, Micronesia, Polynesia, Hawaii.

The fourth dorsal spine is usually more elongated in the young, but it is always with a more or less broadly membranous border behind. Some old examples also show rather large variable trifid or bifid supraorbital spines.

515. Biri Channel. June 2, 1909. Length 126 mm.
4638. Bubuan Island. February 14, 1909. Length 97 mm.
4616. Calangaman Island. March 16, 1909. Length 141 mm.
1248. Candaraman. January 4, 1909. Length 120 mm.
7975. Catbalogan, Samar. April 16, 1908. Length 115 mm.
3889, 3890. Endeavor Strait. December 23, 1908. Length 106 to 140 mm.
18987. Gubat Bay, Luzon. June 23, 1909. Length 122 mm.
7748. Jolo market. February 12, 1908. Length 149 mm.
1103, 1104, 6032, 6081. Little Santa Cruz Island. May 28, 1908. Length 105 to 157 mm.
6789. Malanipa Island. April 29, 1909. Length 165 mm.
6241, 6272, 6278. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 148 to 150 mm.
8901. Near Palag Bay, Luzon. June 16, 1909. Length 146 mm.
447. Pandanon Island. March 23, 1909. Length 84 mm.
4778. Port Maricaban. July 21, 1908. Length 140 mm.
724. Port Palapag. June 23, 1909. Length 118 mm.
9312. Silino Island. April 10, 1909. Length 159 mm.
One example. Subig Bay. January 7, 1908. Length 26 mm.
999, 1000, 1001. Tataan, Simalue Island. February 20, 1908. Length 100 to 121 mm.
4979. Tataan Island. February 21, 1908. Length 147 mm.
5829. Tataidaga Bay. May 15, 1908. Length 128 mm.
262. Tutu Bay, Jolo, second anchorage. September 19, 1909. Length 115 mm.
486. Talisse Island. November 9, 1909. Length 120 mm.
A1210. Gomomo Island. December 3, 1909. Length 140 mm.
52523 U.S.N.M. Samoa. Bureau of Fisheries. Length 76 to 134 mm. Three examples.

HENIOCHUS SINGULARIUS Smith and Radcliffe

Heniochus singularius Smith and Radcliffe, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 321, fig. 2. Alibijaban Island, Luzon, Philippines, Formosa, East Borneo, Celebes, Gillolo Island.—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 77, pl. 18, fig. 2 (Batangas and Quiminatin).

Depth 1⅓ to 1⅗; head 3 to 3¼, width 2 to 2⅕. Snout 2⅗ to 2½ in head; eye 3⅓ to 4, 1⅖ to 1¾ in snout, 1 to 1¼ in interorbital; maxillary ⅔ to ¾ in snout, 4 to 5 in head; interorbital 3½ to 3¾, broadly convex; above each eye a strong, short, horny spine, less than pupil and little developed in smaller examples; with age obtuse, short bony tubercle at predorsal. Gill rakers 2 + 10, short points, about $\frac{1}{10}$ of gill filaments, which equal eye.

Tubes 55 or 56 in lateral line to caudal base; 12 to 14 scales above lateral line, 28 or 29 below. Scales with 10 to 12 basal radiating striae and 0 to 6 incomplete auxiliaries; apical denticles 80 to 145, with 13 to 22 transverse series of basal elements; circuli fine.

D. XII, 27, i or 28, i, fourth spine $1\frac{2}{3}$ to $2\frac{1}{8}$ in combined head and body, sixth ray $1\frac{2}{5}$ to $1\frac{2}{3}$ in head; A. III, 16, i or 17, i, third spine $1\frac{3}{5}$ to $1\frac{4}{5}$, fourth ray $1\frac{1}{8}$ to $1\frac{1}{4}$; least depth of caudal peduncle 3 to $3\frac{1}{8}$; caudal truncate, slightly convex behind with age, $1\frac{2}{5}$ to $1\frac{3}{5}$; pectoral 1 to $1\frac{1}{8}$; ventral 1 to $1\frac{1}{5}$.

Largely dark brown. Pale or whitish band from middle of interorbital down over nostrils to chin, where broader. Lips similarly pale. Broad pale to whitish vertical band from predorsal above tubercle down including greater postocular region to chest, where greatly widened down to ventrals. Dorsals, caudal and pectorals all pale to whitish. This leaves large median area of body dark with its front and hind marginal sections as broad blackish bands, including below ventrals and anal; inner margins of band diffuse within brown and little marked.

Philippines, Formosa. A handsome species, greatly like *Heniochus varius* but with pale lips and a pale band vertically across the muzzle. It also has a uniformly pale or light soft dorsal and caudal, besides most of the spinous dorsal.

8148, 8149, 8162 (No. 67,354 U.S.N.M. Type). Alibijaban Island, Ragay Gulf, Luzon. Length 217 to 220 mm. Interorbital below horns and still lower white, slightly dusky before cheek. Bar from front of dorsal downward includes all of head posteriorly except opercle tip and all of breast to ventral bases silvery white, upper portion slightly dusky with somewhat brassy tinge. Third dorsal spine gray, color continued as lighter band diagonally across side through middle of anal. First 2 dorsal spines black, color passes downward to include all of ventral bases and all of abdominal region darker, scales marginal darker brown with pearly or purplish centers. Dorsal from tip of fifth spine to base of sixth and diagonally along its basal edge, including upper and posterior caudal peduncle and all of caudal fin cadmium orange, becoming slightly dusky toward tips of soft rays; scales below dorsal posteriorly black, especially marginally, center of each with steel bluish area, becoming smaller lower down toward anal base. Front and vertical edge of anal purplish black. Pectoral base blackish, including all ray bases and all of scaly portion, rest lemon yellow. Ventral black.

8717. Batan Island, Rapurapu Island. June 5, 1909. Length 185 mm.
8239. Galvaney Island, Ragay Gulf. March 9, 1909. Length 238 mm.
9348. Murcielagos Bay, Mindanao. April 21, 1909. Length 180 mm.
8387. Port Dupon, Leyte Island. March 17, 1909. Length 192 mm.
A701, A702. Si Amil Island. September 26, 1909. Length 225 to 227 mm.
7706. Ulugan Bay near Rita Island. December 29, 1909. Length 173 mm.
A963, A964. Binang Unang Island. November 17, 1909. Length 210 to 219 mm.
A1153, A1154. Gane Road, Gillolo Island. December 1, 1909. Length 152 to 170 mm.
A1598. Soo Wan, Formosa. January 29, 1910. Length 200 mm.

HENIOCHUS ACUMINATUS (Linnaeus)

Chaetodon acuminatus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 272. Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 460.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1241 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 410 (on Linnaeus).—Forster, Fauna Indica, 1795, p. 14.—Schneider, Syst. Ichth. Bloch, 1801, p. 229 (India).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 455, 479 (on Linnaeus).

Chetodon acuminatus Bonnaterre, Tabl. Ichth., 1788, p. 80 (Indies).

Heniochus acuminatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 98 (copied).—Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903(1905), p. 376, pl. 55 (Honolulu).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906(1907), p. 97 (Bulan, San Fabian).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Sorong, New Guinea).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 310 (Tual and Postillon Island).—McCulloch, Austral. Zoologist, vol. 2, pt. 3, Feb. 10, 1922, p. 91, pl. 27, fig. 232 (New South Wales).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 252 (Natal); Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 76, pl. 19, fig. 2 (Subic Bay, Puerto Galera, Calapan, Gaspar, Bennett Island, Gato, Cebu, Buenavista, Jolo).

Chaetodon macrolepidotus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 274. Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 464.—Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 69, pl. 100, fig. 1 (East Indies).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1247 (Indies).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 416 (on Linnaeus and Bloch).—Forster, Fauna Indica, 1795, p. 15.—Blumenbach, Handb. Nat., 1799, p. 275.—Schneider, Syst. Ichth. Bloch, 1801, p. 231 (India).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 455, 478, pl. 12, fig. 1 (East Indies).

Chetodon macrolepidotus Bonnaterre, Tabl. Ichth., 1788, p. 85, pl. 46, fig. 175 (India).

Heniochus macrolepidotus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 93 (Mauritius, Manila, Celebes, New Guinea, Trinquemale).—Rüppell, Neue Wirbelthiere, Fische, 1835, p. 36 (Red Sea).—Schlegel, Fauna Japonica, Poiss., dec. 5–6, 1844, p. 82, pl. 44, fig. 1 (Nagasaki).—Richardson, Ichth. China Japan, 1846, p. 246 (copied).—Günther, Cat. Fish, Brit. Mus., vol. 2, 1860, p. 39 (Ceylon, Amboina, Port Essington, Australia).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 26.—Bleeker, Nederland. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).—Day, Fishes of Malabar, 1865, p. 33.—Playfair, Fishes of Zanzibar, 1866, p. 37.—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 784 (Red Sea).—Capello, Jorn. Soc. Sci. Lisboa, 1871, p. 200 (Mozambique).—Day, Fishes of India, pt. 1, 1875, p. 110, pl. 8, fig. 3.—Martens, Preuss Exp. Ost-Asien, 1876, p. 388 (Singapore).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 438 (Mauritius).—Macleay, Proc. Linn. Soc. New South Wales, vol. 2, 1878, p. 352 (Port Darwin).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 155 (Hirado).—Klunzinger, Fische Roth. Meer., 1884, p. 58, pl. 8, fig. 3.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes; Cebu).—Boulenger, Proc. Zool. Soc. London, 1887, p. 657 (Muscat, East Arabia).—Pfeffer, Jahrb. Hamburg. Wiss. Anstalt., vol. 6, 1889, p. 22 (Zanzibar).—Day, Fauna Brit. India, pt. 2, 1889, p. 12, fig. 3.—Vinciguerra, Giorn. Rom. Sci. Biol., ser. 2, vol. 19, 1890, p. 486 (Zanzibar).—Pfeffer, Ost-Afrik. Fische, 1893, p. 8.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p.

488 (Manila, Luzon, Novatas).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 52.—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 542 (Wakanoura and Nagasaki).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 544 (Padang).—Regan, Journ. Bombay Nat. Hist. Soc., vol. 16, pt. 2, 1905, p. 330 (Persian Gulf).—Gilchrist and Thompson, Ann. South African Mus., vol. 6, pt. 2, 1908, p. 160 (Natal).—Franz, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 50 (Fukuura and Aburatsubo, Japan).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 11 (Oman).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Diego Suarez, Madagascar).—McCulloch, Biol. Res. Endeavour, vol. 4, pt. 4, Oct. 31, 1916, p. 193 (off New South Wales).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 607 (Natal, Delagoa Bay, Mozambique).

Diphreutes macrolepidotus Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1141 (Pinang, Singapore, Malay Peninsula).

Taurichthys macrolepidotus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1878, p. 29 (Sumatra, Pinang, Singapore, Java, Bali, Sumbawa, Solor, Timor, Celebes, Ternate, Batjan, Buru, Obi major, Amboina, Ceram, Banda, Luzon, New Guinea).

Taurichthys microlepidotus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1878, p. 29, pl. (5)367, fig. 1.

Chaetodon bifasciatus Shaw, Gen. Zool., vol. 4, 1803, p. 342. Indian Seas,

Chaetodon mycteryzans Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 76. No locality (on Valentyn).

Heniochus intermedius Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 102, Heft 1, 1893, p. 222, pl. 2, fig. 2. Red Sea at Suez.

Heniochus diphreutes Jordan, Proc. U. S. Nat. Mus., vol. 26, 1903, p. 694, fig. 3. Wakamoura, Japan.

Depth 1¼ to 1⅖; head 2¾ to 2⅞, width 2⅛ to 2¼. Snout 2¼ to 2¾ in head; eye 3 to 3¾, 1⅛ to 1½ in snout, greater than interorbital; maxillary ⅗ to ⅔ in snout, 4⅕ to 5 in head; interorbital 3⅔ to 3⅘, broadly convex; with age small, low supraorbital spine anteriorly. Gill rakers 3 + 11 short points, about ⅒ of gill filaments, which 1⅕ in eye.

Tubes 44 to 46 in lateral line to caudal base; 10 or 11 scales above lateral line, 25 or 26 below. Scales with 10 or 11 basal radiating striae; apical denticles 68 to 113, with 11 to 25 transverse series of basal elements; circuli fine.

D. XI or XII, 24, i to 26, i, fourth spine elongate filament, in some examples greater than total length of fish by half length of combined head and body, tenth ray 1⅖ to 1⅔ in head; A. III, 18, i or 19, i, third spine 1½ to 1⅘, fourth ray 1 to 1⅕; least depth of caudal peduncle 2¾ to 3; caudal truncate, hind edge slightly convex not expanded, 1⅖ to 1½; pectoral 2⅕ to 3 in combined head and body; ventral 2⅗ to 3¼.

Largely whitish. Broad blackish-brown band from front of spinous dorsal, widening below to include pectoral base and all of postventral space, also extended below along front or lower edge of anal. Another similar band, little more inclined, from middle of spinous dorsal down to include posterior half of anal. Pectoral whitish, like caudal. Ventral black. Iris whitish.

Red Sea, Zanzibar, Mozambique, Natal, Mauritius, Reunion, Seychelles, India, Andamans, East Indies, Philippines, China, Japan, Riu Kiu, Queensland, Polynesia, Hawaii.

18509. Canmahala Bay, Ragay Gulf, in small stream. March 11, 1909. Length 47 mm.

4748. Cebu market. August 27–28, 1909. Length 31–37 mm. Five examples.

8243, 8248, 8249. Galvaney Island, Ragay Gulf, Luxon. March 9, 1909. Length 130 to 170 mm.

5195. Jolo market. March 7, 1908. Length 167 mm.

11677. Mariveles Bay. January 30, 1909. Length 88 mm.

8425. Pandanon Island. March 23, 1909. Length 136 mm.

4748, 4753. Subig Bay. January 7, 1908. Three examples. Length 24 to 92 mm. Black bar between eyes and black above snout. Black band from front of dorsal and first 3 spines to and including ventrals; black band after fourth dorsal spine to eleventh, obliquely back and downward and including posterior half of anal. Anal spines and edge black. Tips of last four dorsal spines, all of soft dorsal, caudal and pectoral lemon yellow. Produced dorsal spine pure white with front edge dusky, white extending below and including anal. Breast and head silvery.

2029 (D.5147). February 16, 1908. Length 42 mm.

A1541. Doc Can Island. January 7, 1910. Length 152 mm.

A930. Dodepo and Pasejogo Islands, Dutch East Indies. November 16, 1909. Length 168 mm. Bands alternately white and brown, central white band continued through extended dorsal ray. Ends of dorsal, caudal and pectoral lemon yellow.

32697 U.S.N.M. Indian Archipelago. Leiden Museum. Length 168 mm.

43939. U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 125 to 243 mm. Four examples.

51088 U.S.N.M. Hawaii. Bureau of Fisheries. Length 170 mm.

52471. U.S.N.M. Samoa. Bureau of Fisheries. Length 138 mm.

52798 U.S.N.M. Hawaii. Bureau of Fisheries. Length 163 mm.

55027 U.S.N.M. Honolulu. *Albatross* collection. Length 150 to 163 mm. Two examples.

55961 U.S.N.M. Bacon, Philippines. Bureau of Fisheries. Length 108 mm.

55976 U.S.N.M. San Fabian. Bureau of Fisheries. Length 52 mm.

71692 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 62 to 70 mm. Two examples.

82779 U.S.N.M. Fiji. Wilkes Exploring Expedition. Length 38 to 50 mm. Two examples.

Genus **HOLACANTHUS** Lacépède

Holacanthus Lacépède, Hist. Nat. Poiss., vol. 4, 1803, p. 525. Type *Chaetodon tricolor* Bloch, designated by Bleeker, Arch. Néerland. Sci. Nat., vol. 12, 1876, p. 307.

Genicanthus Swainson, Nat. Hist. Animals, vol. 2, 1839, p. 212. Type *Holacanthus lamarck* Lacépède, designated by Swain, Proc. Acad. Nat. Sci. Philadelphia, 1882, p. 273.

Centropyge Kaup, Arch. Naturg., vol. 26, abth. 1, p. 138. Type *Holacanthus tibicen* Cuvier, monotypic.

Chaetodontoplus Bleeker, Arch. Néerland. Sci. Nat., vol. 12, 1876, p. 307. Type *Holacanthus septentrionalis* Schlegel, orthotypic.

Acanthochaetodon Bleeker, Arch. Néerland. Sci. Nat., vol. 12, 1876, p. 308. Type *Holacanthus annularis* Lacépède, orthotypic.

Angelichthys Jordan and Evermann, Rep. U. S. Fish Comm., pt. 21, 1895 (1896), p. 420. Type *Chaetodon ciliaris* Linnaeus, orthotypic.

Xiphypops Jordan and Jordan, Mem. Carnegie Mus., vol. 10, 1922, p. 64. Type *Holacanthus fisheri* Snyder, orthotypic.

Body ovoid, oblong ovoid or subrhomboid, rather robust. Hind preopercle edge serrate and with large spine at angle below, which usually grooved. Short interopercle with strong spines. Scales small, roughened and usually with many small ones intermixed, in 50 to 90 series transversely on body. Though lateral line usually concurrent with profile of back and complete to caudal base, mostly inconspicuous. Dorsal spines strong, 12 to 15, graduated usually to last which longest. Soft dorsal and anal usually rounded, sometimes pointed, only occasionally former ending in filament posteriorly. Caudal mostly rounded. Ventrals usually little longer than pectorals.

Among the most handsome of coral reef fishes the members of this genus are rather noteworthy for the richness of their colors, though frequently gaudy and of beautiful design. Some are among the most extreme in contrast of colors of all fishes.

Besides the numerous species listed below, 2 small examples 10 to 13 mm. long from Varadero Bay, July 22, 1908, are evidently the young of some species of *Holacanthus*, apparently at present unidentifiable.

ANALYSIS OF THE SPECIES

a^1. GENICANTHUS. Caudal emarginate or deeply lunate, upper and lower point ending in filament; scales about 45 to 55 in lateral line; dorsal spines 15; soft dorsal and anal more or less pointed.

b^1. Side with 3 or 4 dark longitudinal bands; predorsal with yellow spot; ventrals yellow or dusky ---------- **lamarck**

b^2. Uniform grayish red, caudal bordered dark above and below ---------- **caudovittatus**

b^3. Side with 15 transverse dark lines; preventral with dark spot; ventrals pale ---------- **melanospilus**

a^2. Caudal obtuse or rounded convexly behind.

c^1. Scales with exposed surfaces smoothly and horizontally striated, with or without spinulose border, basal edge lobated; gill membranes broadly joined with isthmus.

d^1. HOLACANTHUS. Scales large, about 30 to 60 in lateral line.

e^1. Soft dorsal and anal rounded, without any marginal angle.

f^1 Head bluish, with variable small yellow spots and blotches; black ocellus on soft dorsal posteriorly; body without bands ---------- **xanthometopon**

f^2. Head not blue and without varigated yellow markings.

g^1. No narrow, transverse, parallel, dark lateral bands; no ocellus on soft dorsal.

h^1. Caudal dusky; body dark, anteriorly greenish violet, posteriorly brown or blackish violet ---------- **vroliki**

h^2. Caudal yellow.

i^1. Body yellow; dark ocellus at predorsal and another humeral; anal with broad, dark, outer band ---- **trimaculatus**

i^2. Body with 2 broad blackish blotches, first inclined from head above and predorsal to belly, second from soft dorsal base to include anal ---------- **navarchus**

i^3. Brown, each scale with light crescentic streak ---------- **xanthurus**

g^2. Transversely 6 to 8 sharply defined black-bordered lateral bands; anal with longitudinal blue bands ------ **diacanthus**

e^2. Soft dorsal and anal pointed or at least distinctly angular.

j^1. Body uniform or without distinct dark horizontal or few to many dark transverse lateral bands.

k^1. Body yellow; border of eye dusky; soft vertical fins with submarginal dusky lines ---------- **flavissimus**

k^2. Anterior half of body yellow, sharply contrasted with black posterior half ---------- **bicolor**

k^3. Body largely uniformly dark.

l^1. White contrasted lateral blotch below middle of spinous dorsal ---------- **tibicen**

l^2. Body uniformly black ---------- **nox**

- j^2. Pale gray; broad black horizontal band from eye to last soft dorsal rays; caudal and anal bordered black-**arcuatus**
- j^3. Transverse median white lateral band, as blotch with age, from last dorsal spines to vent ---------------**asfur**
- j^4. Body with few or many dark transverse lateral bands, variably defined.
  - m^1. Body with 5 or 6 dark transverse bands.
    - n^1. Transverse white band from predorsal down along preopercle to spine ------------------**sexstriatus**
    - n^2. No whitish band from predorsal down side of head --**loriculus**
  - m^2. Body with numerous transverse lateral bands, which may be well defined or diffuse.
    - o^1. About a dozen sharply defined transverse black lateral bands extend on fins ---------**multifasciatus**
    - o^2. Transverse dark lateral bands ill defined, numerous, not on vertical fins.
      - p^1. No dark ocellus at shoulder.
        - q^1. Head largely uniformly dark or with but few dark transverse streaks --------------**bispinosus**
        - q^2. Head and body lighter and all transverse dusky streaks greatly contrasted and distinct, especially on head --**potteri**
      - p^2. Dark ocellus or diffuse dark blotch at shoulder or above pectoral.
        - r^1. Black blue-edged ocellus at shoulder; blue line along dorsal and anal bases------**multispinis**
        - r^2. Dark diffuse blotch above pectoral axil; dorsal and anal reddish orange, like body; caudal yellow; paired fins orange--**fisheri**

d^2. ACANTHOCHAETODON. Scales very small, about 70 to 90 in lateral line; caudal convexly rounded behind.

- s^1. Soft dorsal and anal pointed; body mottled with small irregular bluish spots; vertical fins with blue spots ---**lepidolepis**
- s^2. Soft dorsal and anal rounded; body with lines or bands transverse or longitudinal.
  - t^1. Body blue, violet or blackish violet, without spots; transverse blue or whitish bands curved.
    - u^1. Posteriorly lines or bands arched but not circular--------------------**semicirculatus**
    - u^2. Posteriorly lines arched and circular, at least in young----------------**nicobariensis**
  - t^2. Bands or lines inclined upward posteriorly.
    - v^1. Bands on trunk 15 to 25; supra-scapular and postocular region dusky; no humeral ring ---**imperator**
    - v^2. Six blue bands on trunk and blue humeral ring-------------------------**annularis**

c^2. CHAETODONTOPLUS. Scales with exposed surfaces densely spinulose and basal edge not lobated; gill membranes very broadly joined with isthmus.

w^1. Dark ocular band from neck across chest; brown part of body finely reticulated with blue; caudal white ---------- **mesoleucus**

w^2. No dark ocular band.

- x^1. Body with horizontal blue lines or bands at least on head and front of body; caudal yellow.
  - y^1. Body with about 7 to 10 longitudinal parallel well defined blue lines, extend at least to caudal base, variably horizontal or slightly inclined on soft dorsal and anal ---------- **septentrionalis**
  - y^2. Head and front of trunk with numerous waved longitudinal somewhat irregular blue lines, but obsolete on tail; dorsal with 1 blue and anal 2 -- **chrysocephalus**
- x^2. Body largely dark or dusky, at least without blue longitudinal lines or stripes; head and front at least lighter than body, uniform to blotched, marbled or spotted with darker.
  - z^1. Dorsal and anal dark purplish, with many pale blue waved interrupted horizontal lines; sides of head and breast lighter than body, uniform to dark spotted; broad yellow band from spinous dorsal front to pectoral base and belly; second yellow band from middle of spinous dorsal to caudal peduncle, widening from front ---------- **duboulayi**
  - z^2. Dorsal and anal like body, without blue lines.

a^1. Broad creamy band from predorsal to pectoral, sometimes below includes whole breast; snout and head yellowish brown, rest of head smoke brown variably without or with small to large yellow spots ---------- **conspicillatus**

a^2. Head without broad creamy band from predorsal to pectoral base or below.

- b^1. Body largely uniformly dusky, equally dark above as below; caudal yellow, with dark median blotch ---------- **melanosoma**
- b^2. Body lighter brown above, line of demarcation along side strongly contrasted with lower dark half of body; caudal uniform yellow. **dimidiatus**

HOLACANTHUS LAMARCK Lacépède

Holacanthus lamarck Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 526, 530. No locality (Holland Collection).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 198, pl. 184 (East Indies).

Holacanthus lamarckii Günther, Cruise Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).

Holacanthus lamarcki Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 59, pl. (9) 371, fig. 4 (Buru, Amboina, Ceram, Nusa Laut, Banda).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 83, pl. 16 (Tablas).

Genicanthus lamarckii Swainson, Nat. Hist. Animals, vol. 2, 1839, p. 212 (on Lacépède).

Depth 1⅘ to 2⅛; head 3⅗ to 4, width 1⅗ to 1⅔. Snout 2¾ to 3 in head; eye 3½ to 3⅞, 1⅕ to 1⅖ in snout, 1⅕ to 1¼ in interorbital; maxillary reaches ¾ in snout, 4⅛ in head; interorbital 3, convex. Gill rakers 4 + 12, lanceolate, ⅓ of gill filaments, which 1⅓ in eye.

Scales 45 to 50 between gill opening and caudal base; tubes 43 to 47 in lateral line; 6 or 7 scales above lateral line, 21 to 23 below. Scales with 7 basal radiating striae, 3 to 7 auxiliaries sometimes present; apical denticles 20 to 37, each with rod-like base, often many auxiliary denticles; circuli fine.

D. XV, 15, I to 17, I, last spine 1⅖ to 1⅞ in head, eighth ray 1¼ to 1⅖; A. III, 17, I or 18, I, third spine 1½ to 1¾, eighth ray 1⅛ to 1½; least depth of caudal peduncle 2 to 2⅛; caudal 1⅗ to 1¾ in combined head and body, deeply lunate, exserted upper and lower points long as rest of fin; pectoral 1 to 1⅕ in head; ventral 3⅓ to 3½ in combined head and body.

Pale brown generally, back little darker than sides and lower surface. Four longitudinal dark brown lines from vertical of eye to caudal base, of which all but lower touch hind eye edge; uppermost horizontal from suprascapula and follows along below greater part of arch of lateral line, so that it appears broadened. Upper outer portions of dorsals broadly blackish, behind only extending to point of soft dorsal, basal portion of latter finely dotted with dusky brown. Soft anal finely dotted with dusky brown. Caudal with upper and lower borders, including points, broadly dusky brown, median part of fin finely dotted with dusky brown. Paired fins dull brownish.

East Indies. Apparently rare in collections, though known to the early naturalists, such as Ruysch, Valentyn, and Renard. Its appearance is quite unlike most members of the genus and suggests certain Pseudochromids superficially. Great variation in the color pattern is noticeable. Our 2 larger examples both show a broad dusky band embracing and coextensive with the uppermost dark longitudinal line, it crossing obliquely down on caudal peduncle laterally nearly till median. The dark longitudinal lines are variably waved in all the specimens, only all break into spots or dots at the caudal base. Also the 2 large examples differ in that the ventrals are pale and not black as in the third example. Further they have the upper and lower edges of the caudal fin bordered broadly with brownish.

4755 [1250]. Busin Harbor, Burias Island. April 22, 1908. Length 164 mm. Gray, head and back slaty gray. Below upper black stripe silvery gray. Broad black stripe from upper part of eye posteriorly following below lateral line and about middle of upper portion of caudal peduncle; in part at arch of lateral line stripe wide as eye, narrowing at either end; second stripe from behind middle of eye about half diameter of pupil passing straight back and joins broader stripe at its end, then continues to caudal base; third stripe originates under eye, passes obliquely downward across upper cheek, thence backward to caudal; fourth stripe begins on lower posterior edge of preopercle and passes through pectoral base to lower caudal base. Chin and breast somewhat dusky. Dorsal slaty black, margin behind first 4 spines very narrowly white, continued to top of vertical edge or tip of longest soft ray; from base of last spine black narrows slightly, leaving lower portion of soft dorsal including all of last 3 rays gray; this region with numerous small dusky spots, these also on adjacent body and form an interrupted line across upper portion of caudal peduncle. Anal like body color, with more specks than other soft vertical fins, but rather obscure. Caudal with broad slaty stripes on edge of each lobe; produced ray pale from about middle of fin, not quite reaching tip; body of fin gray, with numerous slaty specks similar to soft dorsal. All soft vertical fins with slight lavender shades. Pectoral rays slightly dusky, membranes hyaline, with lavender shades basally; stripe of dusky from head shows as upper basal dusky spot. Ventral dusky, with slight lavender shade.

444 [1282]. Galvaney Island, Luzon. March 9, 1909. Length 210 mm.

3616 [1251]. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 196 mm. to tip of caudal.

HOLACANTHUS CAUDOVITTATUS Günther

Holacanthus caudovittatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 44. Mauritius.

Body and fins not elevated. Lower preopercle edge with several small teeth. Scales 45 in lateral line. D. XV, 16; A. III, 18; soft dorsal and anal angular posteriorly; caudal lobes produced. Uniform grayish-red when dried. Tail and caudal with black band along upper and lower margins, upper continued along soft dorsal base. Length 158 mm. (Günther.)

Differs from *Holacanthus lamarck* in its dark bordered caudal and absence of dark lateral bands.

HOLACANTHUS MELANOSPILUS Bleeker

Holacanthus melanospilus BLEEKER, Act. Soc. Sci. Ind. Néerland. (Acht. Visch. Amboin.), vol. 2, 1857, p. 56. Amboina.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 48 (copied).

Holacanthus melanospilus BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 60, pl. (6) 368, fig. 2 (Amboina).—KLUNZINGER, Fische Roth. Meer., 1884, p. 60 (Koseir).

Greenish to yellowish silvery, with 15 transverse dusky narrow bars and 7 dusky lines over top of head. Black ocellus on breast before ventral base. Length 211 mm. (Bleeker.)

Apparently related to *Holacanthus lamarck*, the soft dorsal and anal ending in slender points.

HOLACANTHUS XANTHOMETOPON Bleeker

Holacanthus xanthometopon Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 258. Telokbetong, Sumatra.—Günther, Cat. Fish. Brit. Mus. vol. 2, 1860, p. 51 (copied).—Day, Fishes of India, pt. 1, 1875, p. 114 (Andamans).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 64, pl. (9) 371, fig. 2 (Sumatra, Goram, Waigiu).—Day, Fauna Brit. India, vol. 2, 1889, p. 18.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 489 (Cavite, Luzon).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 95 (Quiminatin and Cebu).

Depth $1\frac{2}{3}$ to $1\frac{7}{8}$; head $2\frac{2}{5}$ to $2\frac{3}{5}$, width $1\frac{2}{5}$ to $1\frac{3}{5}$. Snout 2 to $2\frac{2}{3}$ in head from snout tip; eye $3\frac{4}{5}$ to 6, $1\frac{2}{5}$ to 3 in snout, $1\frac{1}{5}$ to 2 in interorbital; maxillary extends about first $\frac{2}{5}$ in snout, half way or until opposite front nostril in young, 3 to $3\frac{3}{5}$ in head; interorbital 3 to $3\frac{1}{8}$, broadly convex; preopercle spine along inner edge $2\frac{2}{3}$ to $3\frac{2}{3}$. Gill rakers 5+11 or 12 short tubercles about $\frac{1}{4}$ to $\frac{1}{6}$ of gill filaments, which about long as eye.

Scales 50 to 52 counted along and above lateral line to caudal base; tubular scales 46 or 47; 7 scales above lateral line, 20 or 21 below. Scales with 6 basal radiating striae; apical denticles 42 to 74, each with long slender root; circuli fine.

D. XIII or XIV, 17, i or 18, i, last spine $1\frac{3}{5}$ to 2 in total head length, eighth ray 1 to $1\frac{1}{4}$; A. III, 17, i, third spine $1\frac{7}{8}$ to 2, tenth ray $1\frac{1}{10}$ to $1\frac{1}{2}$; least depth of caudal peduncle 2 to $2\frac{1}{10}$; caudal convex behind, $1\frac{1}{4}$ to $1\frac{1}{2}$; pectoral 1 to $1\frac{1}{4}$; ventral $2\frac{3}{4}$ to $2\frac{7}{8}$ in combined head and body.

Generally brown on body, each scale with large bluish blotch, mostly dusky or slaty now. Interorbital broadly forward to include nostrils and rim around orbit, pale brownish to buff, also sometimes obscure bluish spots may be scattered about. Head otherwise dark or neutral-brown, sides variably, though usually with thick-set buff spots mostly with dark edges or bordering lines. Hind edge of opercular membrane buff. Dorsals, caudal and pectoral buff, each of former 2 fins edged narrowly bluish and sometimes pectoral. Anal largely deep brown anteriorly, paler behind and edge narrowly blue. Soft vertical fins usually, but not always variably marked with fine close-set blue dots, even invading blackish ocellus on last soft dorsal rays, which larger than eye. Ventrals dusky, front edges narrowly bluish. Iris light brownish.

East Indies region. The dorsal ocellus is variable, sometimes extending as black blotch down on front of caudal peduncle above. Bleeker reported but 3 examples, 127 to 239 mm. long.

8153. Alibijaban Island, Ragay Gulf. March 6, 1909. Length 215 mm.
8715. Batan and Rapurapu Islands. June 5, 1909. Length 226 mm.
9243. Camp Overton, Mindanao. August 6, 1909. Length 285 mm.
5366. Cebu market. April 5, 1908. Length 300 mm.
5387. Cebu market. April 6, 1908. Length 232 mm.
7540. Endeavor Strait. December 23, 1908. Length 217 mm.
7242. Masinloc Bay, Zambales Island. November 23, 1908. Length 233 mm.
784. Pandanon Island. March 24, 1909. Length 180 mm.
6550, 6571. Port Maricaban. July 21, 1908. Length 333 to 345 mm.
8904. Rosa Island. June 17, 1909. Length 296 mm.
A548. Sulade Island. September 17, 1909. Length 313 mm.
A900. Limbe Strait, Celebes. November 10, 1909. Length 385 mm.

HOLACANTHUS VROLIKI Bleeker

Holacanthus vroliki BLEEKER, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 339. Amboina; Atlas Ichth., vol. 9, 1877, p. 63, pl. (9) 371, fig. 1 (Flores, Timor, Ternate, Buru, Obi major, Ceram, Amboina).—KLUNZINGER, Fische Roth. Meer., 1884, p. 60.—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 421 (Batjan).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 312 (Banda).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 92, pl. 22, fig. 1 (Calapan, Cagayan de Misamis, Tambagaan, Bungau).

Holacanthus vrolikii GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 51 (Amboina, Ceram).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 787 (Red Sea).

Depth 1⅔ to 1⅞; head 3 to 3⅞, width 1⅖ to 2. Snout 2⅗ to 3; eye 2½ to 4⅛, greater than snout in young to 1⅓ with age, greater than interorbital in young to 1⅕ with age; maxillary about to eye in vertical, 3½ to 3⅗ in head; interorbital 3¼ to 4, broadly convex; preopercle spine along upper edge 2⅗ to 7½. Gill rakers 4+12, short, robust, lanceolate, 4½ in gill filaments, which 1⅕ in eye.

Scales 32 to 46 between gill opening and caudal base; 7 scales above lateral line, 19 or 20 below. Scales with 7 or 8 basal marginal striae; apical denticles 16 to 27, each with long slender rootlet; circuli fine.

D. XIV or XV, 15, i or 16, i, last spine 1⅓ to 1⅔ in head, sixth ray 1¼ to 1⅖; A. III, 16, i, third spine 1⅖ to 1⅗, sixth ray 1⅛ to 1⅕; least depth of caudal peduncle 1⅘ to 2¼; caudal 1 to 1¼, convexly rounded behind; pectoral 1 to 1⅛; ventral 2¾ to 3¼ in combined head and body.

Brown, little paler and fawn color on belly, tail and vertical fins becoming dusky brown. Each scale on trunk and tail anteriorly with rather small light or grayish spot. Iris brown. Posterior opercular border blackish-brown, as broad blackish band on opercle and on shoulder girdle in young. Hind edge of caudal very narrowly whitish. Paired fins brown.

Red Sea, East Indies. In alcohol our examples all show the dark opercular border more contrasted than Bleeker's figure, though most of the gray spots have faded from the cheeks. The anterior portion of the body is also much paler and more contrasted. The preopercular spine is quite variable, often asymmetrical or short on one side of the head and long on the other.

14891, 22114. Alimango Bay, Burias Island. March 5, 1909. Length 77 to 99 mm.
20488. Batan Island. June 5, 1909. Length 80 mm.
3608. Biri Channel. June 1, 1909. Length 88 mm.
One example. Buang Bay, Talajit Island. March 15, 1909. Length 127 mm.
1157. Busin Harbor. April 23, 1908. Length 95 mm.
3621. Busin Harbor. March 7, 1909. Length 87 mm.
288, 3629. Busin Harbor. March 8, 1909. Length 76 to 92 mm.
6067. Cagayanes Island. March 31, 1909. Length 88 mm.
3915, 15077. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 66 to 94 mm.
11854. Caracaran, Batan Island. June 8, 1909. Length 86 mm.
847. Cataingan Bay. April 18, 1908. Length 102 mm.
3586. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 94 mm.
246 to 248. Caxisigan. December 29, 1909. Length 88 to 100 mm.
7828. Cebu market. April 7, 1908. Length 91 mm.
22147. Cebu market. August 28, 1909. Length 68 mm.
7432. Dalaganem Island. April 8, 1909. Length 100 mm.
4635. Grande Island Reef, Subig Bay. January 8, 1908. Length 105 mm.
22809, 22810. Jolo. March 6–7, 1908. Length 86 to 94 mm.
3642. Mactan Island. March 25, 1909. Length 93 mm.
22043. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 77 mm.
21287, 4831. Malanipa Island. September 8, 1909. Length 63 to 68 mm.
31, 3922. Malapascua Island. March 16, 1909. Length 100 to 105 mm.
997. Maricaban Island. January 20, 1908. Length 92 mm.
22937. Mindanao. August 9, 1909. Length 95 mm.
9317. Mompog Island. March 2, 1909. Length 91 mm.
4567. Mompog Island. March 3, 1909. Length 78 mm.
1100, 1229 to 1231, 21966. Murcielagos Bay, Mindanao. August 9, 1909. Length 60 to 80 mm.
4859, 4860. Murcielagos Bay. August 21, 1909. Length 78 to 89 mm.
3609, 15251. Near Palag Bay, Luzon. June 16, 1909. Length 70 to 76 mm.
3905, 22794, 22795. Opol, Mindanao Island. August 4, 1909. Length 66 to 72 mm.
897. Pagapas Bay. February 20, 1909. Length 65 mm.
276, 277, 19070. Paluan Bay, Mindoro. December 11, 1908. Length 72 to 87 mm.
15950. Pangasinan Island. February 13, 1908. Length 67 mm.
4808 to 4810, 19970, 19971. Polloc, Mindanao. May 22, 1908. Length 75 to 92 mm.
358. Port Caltom. December 15, 1908. Length 95 mm.
10300, 10338, 10339, 11025, 22742. Port Maricaban. July 21, 1908. Length 65 to 99 mm.
16535. Port Matalvi, Luzon. November 22, 1908. Length 82 mm.
4602. Port Palapag. June 3, 1909. Length 102 mm.
12657, 12658. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 93 to 105 mm.
751. Port Uson, West Pinas Island. December 17, 1908. Length 77 mm.
634. Port Tilig. July 15, 1908. Length 76 mm.

20927. Puerta Princesa, Palawan Island. April 5, 1909. Length 89 mm.
20982 to 20984, 22211. Rapurapu Island. June 22, 1909. Length 76 to 90 mm.
3907. Reefs South Lagoon, Tumindao. February 26, 1908. Length 75 mm. [305].
17488. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 38 mm.
699 and 700. Sablayan, Mindoro. December 12, 1908. Length 72 to 76 mm.
19592, 19593. Simaluc Island. September 22, 1909. Length 97 to 101 mm.
17972. Simaluc Sibi Sibi Island. September 23, 1909. Length 95 mm.
21886. Singaan Island. September 21, 1909. Length 85 mm.
22771. Sitanki Reef. September 24, 1909. Length 87 mm.
4653. Tambul Sigambul, Tonquil Island. September 14, 1909. Length 38 mm.
19227. Tapiantana Island. September 13, 1909. Length 84 mm.
3883. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 100 mm.
10445. Tilig, Lubang Island. July 14, 1908. Length 90 mm.
21731. Tulayan Island. September 15, 1909. Length 95 mm.
3634. Tulnalutan Island. September 21, 1909. Length 105 mm.
398. Usada Island. March 3, 1908. Length 41 mm.
21456, 21457. Danawan Island and Si Amil Island. September 27, 1909. Length 86 to 92 mm.
453. Doc Can Island. January 7, 1910. Length 86 mm.
4812. Gomomo Island. December 3, 1909. Length 87 mm.
4740. Kapoposang Island. December 28, 1909. Length 73 mm.
550. Kayoa Island. November 29, 1909. Length 85 mm.
9880, 21446. Maitara Island. November 26, 1909. Length 87 to 100 mm.
14399. Talisse Island. November 9, 1909. Length 61 mm.
425. Togian Bay, Togian Island. November 19, 1909. Length 86 mm.
4799, 4800. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 92 mm.
16232. Cape Kait, Libani Bay, Celebes. December 24, 1909. Length 93 mm.
7980. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 79 mm.
4779, 13670. Limbe Strait, Celebes. November 10, 1909. Length 82 to 88 mm.
4827. Sadaa Island, Celebes. November 17, 1909. Length 84 mm.
22673. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 82 mm.
13629. Birabirahan Island, off Borneo. December 31, 1909. Length 61 mm.
4728. Gane Road, Gillolo Island. December 1, 1909. Length 85 mm.
7973. Tidore Island, south of Ternate. November 24, 1909. Length 76 mm.
3897. Tidore Island. November 26, 1909. Length 59 mm.
8273. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 91 mm.

HOLACANTHUS TRIMACULATUS Cuvier

Holacanthus trimaculatus (Lacépède) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 196, pl. 182. Moluccas.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 50 (Amboina and Moluccas).—Playfair, Fishes of Zanzibar, 1866, p. 38 (Zanzibar).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 63, pl. (11) 373, fig. 5 (Java, Amboina, Banda).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 94, pl. 21, fig. 1 (Maricaban, Sayan, Jolo).

Depth 1⅔ to 1¾; head 3⅓ to 3⅔, width 1½ to 1¾. Snout 2¾ to 3 in head from snout tip; eye 3⅗ to 4, 1¼ to 1⅓ in snout, 1⅙ to

1⅕ in interorbital; maxillary ¾ to ⅘ in snout, 3⅓ to 3⅘ in head; interorbital 3 to 3⅕, broadly convex. Gill rakers 4 + 13 short points, ⅕ of gill filaments, which 1⅕ in eye.

Scales 48 or 49 between gill opening and caudal base; 48 to 50 scales in lateral line to caudal base; 9 scales above lateral line, 24 to 28 below. Scales with 6 basal radiating striae; apical denticles 48 to 52, with basal rods, often many auxiliaries; circuli fine.

D. XIV, 17, I or 18, I, last spine 1⅓ to 1⅖ in total head length, seventh ray 1⅛ to 1⅕; A. III, 18, I, last spine 1⅛ to 1¼, third ray 1⅓ to 1⅖; least depth of caudal peduncle 2; caudal convex behind, ends in filament above about long as eye, 1¼ to 1⅓ in head; pectoral 1⅛ to 1⅕; ventral 1 to 1⅕.

Light yellowish brown, each scale on side with large median pale or light spot. Lips dusky brown. Iris light brown. Small black ocellate spot, little less than eye, at predorsal each side of supraoccipital. Deep brown ovate blotch at suprascapula, little smaller than eye and ocellate. Outer half of anals broadly black, fins otherwise all uniformly pale.

Zanzibar, Reunion, East Indies, Philippines. A very handsome species readily known by its general bright yellow or orange color, with a few contrasted dark markings.

9665 [2014]. Mabul Island. September 29, 1909. Length 155 mm.
A1499. Kait Point, Celebes. December 29, 1909. Length 165 mm.

HOLACANTHUS NAVARCHUS Cuvier

Holacanthus navarchus CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 171. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 49 (Amboina); Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 65, pl. (9) 371, fig. 3 (Java, Flores, Amboina, Banda).

Depth 1¾ to 1⅞; head 2⅘ to 3½, width 1¾ to 2. Snout 2⅖ to 3 in head from snout tip; eye 2½ to 4, 1 to 1⅔ in snout, 1⅓ in interorbital and greater than interorbital in young; maxillary reaches opposite ⅗ to ⅔ in snout, 3½ to 3⅘ in head; interorbital 3 to 4, broadly convex; preopercle spine along upper edge 2⅓ to 5⅘. Gill rakers 6 + 12, short strong points, 3½ in gill filaments, which 1⅓ in eye.

Scales 45 to 48 in lateral line to caudal base; 6 scales above lateral line, 20 or 21 below. Scales with 5 or 6 basal radiating striae, apical denticles 25 to 27, each with long slender rootlet; circuli fine.

D. XIII or XIV, 17, I or 18, I, last spine 1½ to 1⅘ in total head length, ninth ray 1⅛ to 1⅓; A. III, 18, I, third spine 1½ to 2⅕, sixth ray 1⅕ to 1⅓; least depth of caudal peduncle 2⅕ to 2⅘; caudal rounded or convex behind, 1¼ to 1⅖; pectoral 1⅛ to 1¼; ventral 2⅓ to 2⅔ in combined head and body.

Light yellowish brown generally, more or less tinged dusky on lower surface between ventrals and caudal peduncle. Dark blackish-brown area from front of interorbital until opposite first few dorsal spines; edges broadly bordered with light blue and young with blue line from front of spinous dorsal to lower hind eye edge, second parallel but much shorter posteriorly and vertically on opercle and third also parallel from above lateral line down to pectoral origin and below hind pectoral base down to belly, and like blue borders of dark area, meeting its fellow. Second blackish-brown area forms on last dorsal rays basally and front of caudal peduncle extends down to anal which entirely same color; all upper front and hind edges bordered with light blue; entire dark area and anal finely dotted with pale blue; in young blue spots absent and median blue line extends from bases of last dorsal rays to those of anal. On trunk and front of tail, within limitation of dark blotch, each scale with basal blotch of brown to slaty. Dorsals, except dark blotch basally and posteriorly, and caudal pale brownish-buff. Vertical fins edged with blue narrowly and submarginal dusky line. Pectoral neutral-dusky, also ventral, but its front edge narrowly blue. Iris dusky.

East Indies. A very unusual species in its color markings and apparently rare in collections. It was known to the early naturalists.

4821. Batan Island. June 5, 1909. Length 157 mm.

8958. Between Paron and Jesus Points, Luzon. June 21, 1909. Length 219 mm.

5389. Cebu market. April 6, 1908. Length 153 mm.

948, 1194 [1397, 1383]. Port Dupon, Leyte Island. March 17, 1909. Length 155 to 158 mm. From interorbital region backward over nape and down through and behind pectoral base smoky purplish, area becomes brownish forward and on each side bordered by broad white stripe or bar; posterior not quite to dorsal base or half way above lateral line, below ends about level with pectoral base; anterior stripe crosses snout in front of nostrils, extends close below lower front eye edge, crosses breast near pectoral base and ends on level with ventral bases; head and breast anteriorly pale ochraceous; snout and chin blackish. Middle of side orange, center of each scale with purplish black spot, becomes larger until dominating color on abdominal surface, orange changing to olive yellow. From middle of soft dorsal base downward to about middle of anal, including posterior part of body and caudal peduncle black, speckled with bluish white. Spinous dorsal in front dusky yellow, including both spines and membranes of first four or incised portion, posteriorly fin bright orange, similar to body; bluish white edge runs from fifth spine around and including vertical edge, with very narrow black submarginal line. End of caudal peduncle and all of caudal bright orange, tip of fin white, black and blue. Anal black, edge black on submarginal bluish white band; across spines 3 similar marginal stripes. body of fin specked with bluish white. Pectoral rays blue black, membranes hyaline. Ventral black medially, olivaceous on 2 last rays with bluish white front and extreme front of spine black.

9663 [2015]. Mabul Island. September 29, 1909. Length 129 mm.

9673. Talisse Island. November 9, 1909. Length 110 mm.

465, 466, 4833. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 96 to 153 mm.

22683. Gane Road, Gillolo Island. December 1, 1909. Length 55 mm.

HOLACANTHUS XANTHURUS Bennett

Holacanthus xanthurus BENNETT, Proc. Comm. Zool. Soc. London, 1832, p. 183. Mauritius.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 51 (type).

Preopercle spine smooth, reaches pectoral base. Scales 46 in lateral line; 7 above, 22 below. D. XIV, 19; A. III, 18; dorsal and anal rounded behind. Brownish, each scale with light crescent-shaped streak. Caudal yellow. (Günther.)

HOLACANTHUS DIACANTHUS (Boddaert)

Chaetodon diacanthus BODDAERT, Descr. Epist. Chaet., 1772, pl.9. Amboina; Moluccas; Schrift. Gesells. Naturf. Fr. Berlin, vol. 3, 1772, p. 459.—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 420.—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 220.

Holacanthus diacanthus GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 48 (Mauritius, Amboina, Ceram).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 37 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 786 (Koseir).—GÜNTHER, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).—BLEEKER, Nederland. Tijds. Dierk., vol. 4, 1874, p. 117 (China).—DAY, Fishes of India, pt. 1, 1875, p. 113.—GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 50, pl. 40, fig. B (Samoa, Society Islands, Paumotus).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 65, pl. (6) 363, fig. 5, (not figure 3) (Celebes, Flores, Timor, Ceram, Amboina, Banda, New Guinea).—KLUNZINGER, Fische Roth. Meer., 1884, p. 60.—DAY, Fauna Brit. India, vol. 2, 1889, p. 17.—SAUVAGE, Hist. Nat. Madagascar Poiss., 1891, p. 266, pl. 33, fig. 3.—JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Manila).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 312 (Banda).—FOWLER, Bishop, Mus. Bull., No. 22, 1925, p. 34 (Samoa).—HERRE and MONTALBAN, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 88, pl. 21, fig. 2 (Romblon, Bantayan, Baganga).

Chaetodon fasciatus (not FORSKÅL) BLOCH, Naturg. Ausl. Fische, vol. 3, 1787, p. 53, pl. 195 (East Indies).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 406.

Chetodon fasciatus BONNATERRE, Tabl. Ichth., 1788, p. 92, pl. 92, fig. 382 (East Indies).

Chaetodon boddaerti GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1243 (on BODDAERT 1772).

Acanthopodus boddaerti LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 558, 559 (Sea of Indies).

Chaetodon dux GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1255. India.—FORSTER, Fauna Indica, 1795, p. 15.

Holacanthus dux LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 527, 534 (Japan).—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 184 (Dorey Harbor, New Guinea).—RÜPPELL, Neue Wirbelthiere, Fische, 1835, p. 37 (Red Sea).

Holacanthus chrysurus CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p, 188. Dorey Harbor, New Guinea.

Holacanthus forsteri GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 48. Ceram (name only).

Holacanthus forsteni BLEEKER, Verh. Kon. Akad. Wet., Amsterdam, vol. 17, No. 2, 1877, p. 139 (name in synonymy).

Holacanthus bispinosus (part) Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 378 (not plate, description from Samoan examples).

Depth 1⅔ to 2⅛; head 3 to 3⅘, width 1⅗ to 1⅔. Snout 2⅗ to 3; eye 3 to 4½, 1 to 1⅞ in snout, 1 to 1⅓ in interorbital; maxillary half way to ⅘ in snout, 3 to 3⅗ in head; interorbital 3¼ to 3⅞, broadly convex; upper edge of preopercle spine 2⅛ to 5¼. Gill rakers 5 + 13, short strong points, ¼ of gill filaments which about equal eye.

Scales 50 to 57 in lateral line, tubes large but not well marked; 7 scales above lateral line, 22 below. Scales with 6 or 7 basal striae, mostly marginal; apical denticles 83 to 88, each with long slender rootlet, variably 2 denticles fusing to single rootlet; circuli fine.

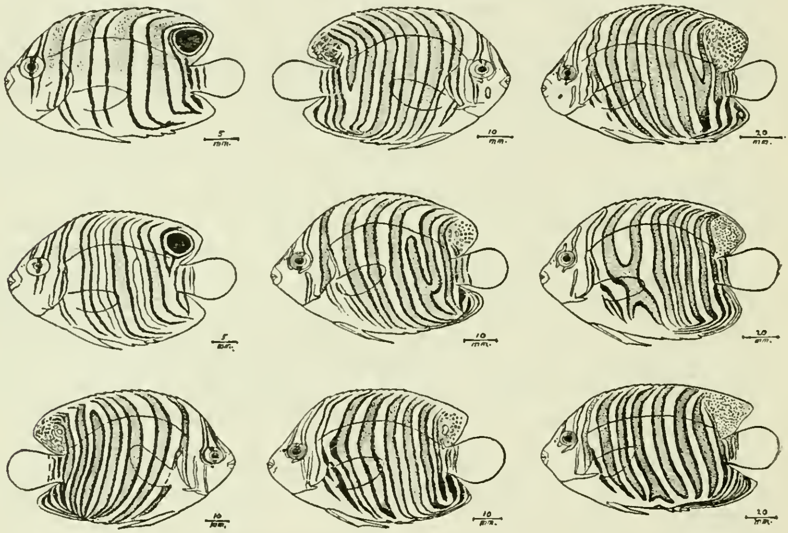
5 mm.
10 mm.
20 mm.
5 mm.
10 mm.
10 mm.
10 mm.
10 mm.
20 mm.

Fig. 8.—Variations in color markings of Holacanthus diacanthus (Boddaert)

D. XIII or XIV, 18, I to 20, I, last spine 1¼ to 1¾ in head, eleventh ray 3⅔ to 4 in combined head and body; A. III, 18, I or 19, I, last spine 1⅓ to 2⅕ in head, tenth ray 3¾ to 4 in combined head and body; least depth of caudal peduncle 2 to 2⅛ in head; caudal 1 to 1⅙, convex behind; pectoral 1 to 1⅕; ventral 3¼ to 3⅔ in combined head and body.

General color pale brown, with yellowish shade. Nine transverse blue-gray bands, tint usually fading out to general pale body color, also each inclined little posteriorly and broadly bordered with deep or dusky brown; extend on spinous dorsal and over most of both anals as longitudinal bluish lines, also becoming broader and vertical posteriorly on anals. Iris brown. Hind border of preopercle and opercle, also most of preopercular spine, bluish. Two parallel bluish lines, variously complete, down from occiput, front one to front border of eye and hind one to hind border of eye; narrow blue line from front of interobital medianly forward toward front of snout; all frontal lines bordered narrowly with dusky. Paired fins and caudal all pale or yellowish-brown, outer terminal portion of ventral with blue margin line and dusky submarginal line.

Red Sea, Zanzibar, Mauritius, East Indies, Melanesia, Micronesia, Polynesia. The color-pattern variable with age. Small examples show but 8 transverse bluish bands, with seventh forming blackish ocellus on soft dorsal, blue borders curving and breaking for its inception. In the very young trunk and tail with but 4 transverse pale bands, intervening areas with only faint indication of dark band; head with 3 narrow transverse pale bands; large black ocellus on soft dorsal larger than eye.

1278. Alibijaban Island. March 6, 1909. Length 153 mm.

4864 to 4866. Alimango Bay, Burias Island. March 5, 1909. Length 150 to 200 mm. Bars orange, not yellow as shown in Bleeker's plate. Bars about eye bright blue. Snout and chin orange, head otherwise dusky, also not yellow as shown by Bleeker. Breast and belly soiled yellowish white. Spinous dorsal orange, orange body bars change to yellow at fin base, then greenish, crossing fin diagonally. Anal orange, bars purple. Soft dorsal purple; black lateral band changing to purple along dorsal base. Tips of dorsal and anal bright blue. Tail bright yellow. Paired fins dusky yellow.

768. Busin Harbor. March 7, 1909. Length 185 mm.

3926, 3927. Caxisigan Island. January 2, 1909. Length 71 to 115 mm.

5376, 5395. Cebu market. April 5, 1908. Length 178 to 180 mm.

5163. Jolo market, Jolo. March 6, 1908. Length 235 mm.

4863. Murcielagos Bay, Mindanao. August 21, 1909. Length 100 mm.

394. Near Palag Bay, Luzon. June 16, 1909. Length 88 mm.

928. Panabutan Bay. February 6, 1908. Length 150 mm.

5920. Parang, Mindanao. May 23, 1908. Length 245 mm.

454. Parang, Mindanao. May 23, 1908. Length 178 mm.

1193. Port Dupon. March 17, 1909. Length 170 mm.

525, 526. Port Galera, Mindoro. June 9, 1908. Length 160 to 184 mm.

6382. Port Jamelo. July 13, 1908. Length 220 mm.

632, 10298, 10465. Port Maricaban. July 21, 1908. Length 153 to 170 mm.

1020, 3597. Port Matalvi, Luzon. November 22, 1908. Length 157 to 167 mm.

7275. Port Matalvi. November 23, 1908. Length 174 mm.

3879. Port Palapag. June 2, 1909. Length 115 mm.

402. Port Palapag. June 3, 1909. Length 128 mm.

795. Taganak Island. January 7, 1909. Length 155 mm.

4945. Tataan, Tawi Tawi Group. February 20, 1908. Length 160 mm.

6448. Tilig, Lubang Island. July 14, 1908. Length 216 mm.

261. Tutu Bay, Jolo, second anchorage. September 19, 1909. Length 153 mm.

456, 14403. Talisse Island. November 9, 1909. Length 48 to 111 mm.

2001, 3895. Danawan and Si Amil Islands. September 27, 1909. Length 36 to 77 mm.

A1269. Uki, Bouro Island, Dutch East Indies. December 9, 1909. Length 178 mm.

A1388. Labuandata Bay, Celebes. December 18, 1909. Length 200 mm.

9717. Una Una Road, Binang Unang Island, Celebes. November 17, 1909. Length 146 mm.

52493. U.S.N.M. Samoa. Bureau of Fisheries. Length 153 to 207 mm. Four examples.

56998 U.S.N.M. Pago Pago, Samoa. Bureau of Fisheries. Length 205 to 220 mm. Two examples.

HOLACANTHUS FLAVISSIMUS Cuvier

Holacanthus flavissimus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 197. Ulea Carolines.—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 52 (copied).—Jordan and Seale, Bull. Bur. Fisheries, vol. 25, 1905 (1906), p. 348 (Pago Pago and Apia).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 101 (Queensland).—Fowler, Occas. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 386 (Honolulu); Bishop Mus. Bull., No. 22, 1925, p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Wake Island).

Holacanthus luteolus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 198, Tahiti.—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 52, pl. 40, fig. B.

Holacanthus cyanotis Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 517. Aneiteum, New Hebrides; Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 52, pl. 40, fig. A (New Hebrides, Kingsmills, Society Islands, Paumotus, Hervey Islands, Samoa, Fiji).

Holacanthus monophthalmus Kner, Sitz. Ber. Akad. Wiss. Wien., Math. Naturw. Kl., vol. 56, 1867, p. 714. Islands of South Sea or west coast of South America. [Raiatea, Society Islands.]

Holacanthus ocularis Peters, Monatsber. Akad. Wiss. Berlin, 1868, p. 147. South Seas.

Holacanthus sphynx De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 457. Queensland coast.

Yellow in life with narrow dusky border around eye. Blue bar along opercle edge. Pale brown bar across chin. Soft vertical fins with white edges and dusky submarginal line.

Melanesia, Micronesia, Polynesia, Hawaii.

52472 U.S.N.M. Samoa. Bureau of Fisheries. Five examples.

HOLACANTHUS BICOLOR (Bloch)

Chaetodon bicolor Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 94, pl. 206, fig. 1. Both Indies.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1258 (Tropical America and India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 418 (on Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 218 (Tropical America and East Indies).

Chetodon bicolor Bonnaterre, Tabl. Ichth., 1788, p. 93, pl. 97, fig. 396 (East Indies).

Holacanthus bicolor Lacépède, Hist. Nat. Poiss., vol. 4, 1803, pp. 527, 535 (East Indies).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 167 (East Indies.)—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 50 (East Indies); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 51, pl. 39, fig. B (Samoa, Solomons, Hawaii).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 61, pl. (7) 369, fig. 3 (Sumatra, Flores, Solor, Ternate, Ceram, Amboina, Saparua, Banda, Aru, New Guinea).—De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884, p. 457 (Queensland coast).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 489 (Luzon, Manila).—Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Manila).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 312 (Banda).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 103 (Moreton Bay).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 34 (Samoa).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September 1927, p. 91 (Bato Bato).

Holacanthus tenigab Thiollière, Fauna Woodlark, 1857, p. 169. Woodlark Island.

Depth 1⅞ to 2; head 3⅓ to 3½, width 1⅔ to 2. Snout 2¾ to 3; eye 3 to 3⅔, 1 to 1⅖ in snout, equal to slightly greater than interorbital; maxillary reaches opposite nostrils, 4 to 4⅓ in head; interorbital 3½ to 3¾, broadly convex; preopercle spine along upper edge 1 to 3¾. Gill rakers 4 + 12, lanceolate, short, strong, ¼ of gill filaments, which 1⅕ in eye.

Scales 45 to 48 between gill opening and caudal base; 7 or 8 scales above lateral line, 20 to 22 below. Scales with 5 to 12 basal radiating striae; apical denticles 17 to 29, each with long slender rootlet; circuli fine.

D. XIV or XV, 15, I or 16, I, last spine 1⅓ to 2 in head, seventh dorsal ray 2⅔ to 3¼ in combined head and body; A. III, 17, I or 18, I, third spine 1⅖ to 1⅗ in head, ninth ray 2⅘ to 3⅓ in combined head and body; least depth of caudal peduncle 1⅞ to 2⅒ in head; caudal convex behind, 1 to 1⅒; pectoral 1 to ⅛; ventral 3 to 3¾ in combined head and body.

Anterior ⅖ of body yellowish-white, also hind half of caudal peduncle and entire caudal fin. From occiput broad blackish-brown band to eye. Posterior half of trunk and tail blackish-brown, each scale within its area with dark blue basal blotch; also vertical fins with dark blue transverse or oblique lines, most distinct and nearly vertical on last rays. Iris pale or whitish, black of superior blotch only invading above. Supraocular blackish blotch with whitish border in front and behind, also front border of dark body area with broad whitish border. Upper edge of soft dorsal narrowly whitish and lower anal edge narrowly bluish. Paired fins whitish.

East Indies, Melanesia, Micronesia, Polynesia. Its coloration is greatly suggestive of the American *Holacanthus tricolor*.

3885. Gandra Island. September 20, 1909. Length 94 mm.
3635, 3636. Teomabal. September 18, 1909. Length 80 to 115 mm.
4862. Murcielagos Bay, Mindanao. August 21, 1909. Length 90 mm.
3894. Opol, Mindanao. August 4, 1909. Length 107 mm.
4849, 4850, 21441. Panpan, Tara Island. September 20, 1909.
One example. Philippines. Length 62 mm.
3913, 3914, 6555. Port Maricaban. July 21, 1908. Length 87 to 113 mm.

413 and [1578]. Port Palapag, near northern Samar. June 3, 1909. Length 102 to 107 mm. Two examples. Differs from Bleeker's figure in dark portions entirely black. Front portion of body dusky cadmium above, sulphur on belly. Margin adjacent to black posterior portion sulphur yellow. Orange spot behind eye above angle of gill opening. Opercle flap orange and dash of same across chin and lower eye edge orange. Upper edge of soft dorsal very narrowly orange; dorsal and anal otherwise black. Caudal cadmium, with sulphur basal line. Paired fins pale cadmium.

3618. Refugio, Pasacao, Luzon. March 9, 1909. Length 95 mm.

1291, 22772. Sitanki Reef. September 24, 1909. Length 80 to 92 mm.

7965. Danawan and Si Amil Islands. September 27, 1908. Length 87 mm.

4786. Labuan Blanda Island. December 14, 1909. Length 110 mm.

3930. Makyan Island. November 29, 1909. Length 81 mm.

457. Talisse Island. November 9, 1909. Length 101 mm.

[2132]. Tomahu Island. December 11, 1909. Length 33 mm.

17984. Limbe Strait, Celebes. November 10, 1909. Length 102 mm.

47827, 47893 U.S.N.M. New Guinea. Australian Museum. Length 110 mm. Two examples.

52301 U.S.N.M. Samoa. Bureau of Fisheries. Length 60 to 132 mm. Four examples.

56995 U.S.N.M. Pago Pago. Bureau of Fisheries. Length 96 to 144 mm. Eleven examples.

HOLACANTHUS TIBICEN Cuvier

Holacanthus tibicen Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 173. No locality (Holland Collection).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 46 (copied).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 62, pl. (8) 370, fig. 4 (Celebes, Flores, Solor, Ternate, Amboina, Ceram).—Waite, Rec. Australian Mus., vol. 3, 1900, p. 203 (Lord Howe Island).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 547 (Nafa, Riu Kiu).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 312 (Banda).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, September 1927, p. 90, pl. 20, fig. 1 (Tubigan, Jolo, Sibutu, Sitanki).

Holacanthus leucopleura Bleeker, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 79. Lawajong, Solor.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 46 (Amboina); Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).

Depth 1⅘ to 1⅞; head 2⅞ to 3½, width 1⅗ to 2. Snout 3 to 3⅕ in head; eye 3 to 3½, 1 to 1⅙ in snout, equals interorbital or slightly greater in young; maxillary reaches nostrils, to eye in young, 3½ to 3⅗ in head; interorbital 3¼ to 3⅔, broadly convex; preopercle spine along upper edge 2¼ to 4¾. Gill rakers 5 + 11, robust, lanceolate, longest ¼ of gill filaments which 1⅔ in eye.

Scales 38 to 40 between gill opening and caudal base; 7 scales above lateral line, 20 or 21 scales below. Scales with 6 to 9 basal radiating striae; apical denticles 15 to 19, each with long slender rootlet; circuli fine.

D. XIV, 16, i or 17, i, last spine 1⅔ to 1¾ in head, eighth ray 1 to 1⅕; A. III, 16, i or 17, i, third spine 1⅗ to 1⅘, eighth ray 1¼ to 1⅓; least depth of caudal peduncle 2 to 2⅕; caudal rounded convexly behind, 1 to 1⅕; pectoral 1 to 1⅛; ventral 3⅛ to 3¼ in combined head and body.

Generally blackish, head with slightly brown tint. Iris and preopercle spine with blue tinge. Large white blotch on side of back. Upper edge of spinous dorsal narrowly bluish. Hind caudal edge narrowly whitish to grayish with submarginal blackish band. Entire lower anal edge broadly whitish, with narrow dividing bluish line. Paired fins dusky brown, ventrals pale to whitish terminally, variably dark.

East Indian region. The large whitish superior lateral blotch is variable in size, extending over from 3 to 6 scales in width.

7249. Candaraman Island. January 4, 1909. Length 91 mm.
12694. Gandra Island. September 20, 1909.
4840, 22230. Little Santa Cruz Island. May 26, 1908. Length 89 to 105 mm.
4830. Malanipa Island. September 8, 1909. Length 103 mm.
4712 [1371]. Malapascua Island. March 16, 1909. Length 112 mm. Blue black. Lateral spot clear white. Dorsal spines and membranes black, not yellow as shown in Bleeker's plate; tip of soft dorsal purple. Anal edge lemon yellow on a bluish white stripe. Caudal tip white. Ventrals lemon yellow, darker at base than in front.
4861, 17135. Murcielagos Bay, Mindanao. August 21, 1909. Length 90 to 100 mm.
3906. Opol, Mindanao. August 4, 1909. Length 83 mm.
4851, 4852, 22024. Panpan, Tapa Island. September 20, 1909. Length 52 to 90 mm.
4741, 4742. Pilas Island. September 12, 1909. Length 82 to 112 mm.
4709. Port Galera, Mindoro. October 27, 1909. Length 96 mm.
722. Port Palapag. June 3, 1909. Length 70 mm.
15710. Sanguisiapo Island. February 24, 1908. Length 71 mm.
22768 to 22770. Sitanki Reef. September 24, 1909. Length 53 to 88 mm.
3921. Sitanki wharf. February 26, 1908. Length 107 mm.
3912. South Lagoon, Tumindao. February 26, 1908. Length 81 mm.
16021. Sulade Island. September 18, 1909. Length 87 mm.
19228. Tapiantana Island. September 13, 1909. Length 96 mm.
4774. Tumindao Island. February 26, 1908. Length 80 mm.
8673. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 92 mm.
22769. Sitanki Reef. September 24, 1909. Length 88 mm.
7966, 16441, 21453 to 21455. Danawan Island and Si Amil Islands. September 27, 1909. Length 56 to 92 mm.
3929, 4739. Makyan Island. November 29, 1909. Length 70 to 88 mm.
One example. Powati Harbor, Makyan Island. November 28, 1909. Length 90 mm.
472. Tomahu Island. December 12, 1909. Length 85 mm.
4838. Cape Kait, Libani Island, Celebes. December 29, 1909. Length 104 mm.
21010. Limbe Strait, Celebes. November 10, 1909. Length 87 mm.

HOLACANTHUS NOX Bleeker

Holacanthus nox Bleeker, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. 338. Amboina.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 51 (copied).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 62, pl. (6) 368, fig. 3 (Amboina and Goram).—Ogilby, Mem. Queensland Mus., vol. 5, 1916, p. 178 (Barrier Reef).

Depth 1¾ to 1⅘; head 3 to 3⅛, width 1⅔ to 1¾. Snout 2⅔ to 3; eye 3 to 3¼, 1 to 1¼ in snout, 1 to 1⅕ in interorbital; maxillary reaches opposite front eye edge, 4⅕ to 4½ in head; interorbital 3½ to 4, broadly convex; preopercle spine along upper edge 2⅖ to 2⅗. Gill rakers 5+13, lanceolate, robust, about ⅓ of gill filaments, which 1⅓ in eye.

Scales 38 to 43 between gill opening and caudal base; 7 or 8 scales above lateral line, 22 or 23 below. Scales with 5 or 6 basal radiating striae; apical denticles 17 to 23, each with long slender rootlet; circuli very fine.

D. XIV or XV, 15, I, or 16, I, last spine 1⅖ to 1⅗ in head, eighth ray 1¼ to 1⅖; A. III, 16, I or 17, I, third spine 1⅕ to 1⅖, tenth ray 1¼ to 1⅖; least depth of caudal peduncle 2 to 2⅖; caudal rounded convexly behind, 1⅕ to 1⅓; pectoral 1⅕ to 1¼; ventral 1 to 1⅛.

Uniform blackish-brown. Most examples with very narrow whitish edge to caudal posteriorly.

East Indian region and Queensland. Previously only known from the Moluccas, we have the following examples from the Philippines, East Indies, and China.

22157. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 90 mm.
18860. Inamucan Bay. August 8, 1909. Length 91 mm.
15960. Masbate Reef. April 20, 1908. Length 84 mm.
17136, 17137. Murcielagos Bay. August 20, 1909. Length 85 to 95 mm.
21602. Pasacao, Ragay Gulf. March 9, 1909. Length 80 mm.
12587. Rapu Rapu Island. June 22, 1909. Length 92 mm.
3617 [1272]. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 92 mm.
20050. Romblon. March 26, 1908. Length 88 mm.
4826 [452]. Romblon Harbor. March 25, 1908. Length 95 mm.
4751. San Miguel Island, Tabaco Bay. June 4, 1909. Length 92 mm.
8674. Tutu Bay, Jolo Island, second anchorage. September 19, 1909. Length 86 mm.
14489. Tomahu Island. December 12, 1909. Length 90 mm.
21009. Limbe Strait, Celebes. November 10, 1909. Length 84 mm.
22674. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 79 mm.
4807. Gane Road, Gillolo Island. December 1, 1909. Length 73 mm.
12388. Hong Kong market, China. August 13, 1908. Length 93 mm.
70751 U.S.N.M. Misaki, Sagami. *Albatross* collection, 1906. Length 13 to 16. mm. Two examples.
75506 U.S.N.M. Nafa, Okinawa. *Albatross* collection. Length 23 to 43 mm. Four examples.

HOLACANTHUS ARCUATUS Gray

Holacanthus arcuatus Gray, Zool. Miscellany, 1831, p. 33. Hawaiian Islands.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 43 (type); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 50, pl. 32, fig. C (type).—Fowler, Occas. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 386 (Honolulu); Bishop Mus. Bull., No. 22, 1925, p. 34 (Honolulu).

Easily known by its pale drab or gray-white color with the broad black median band longitudinally, also hind borders of caudal and anal black.

Hawaiian specimens obtained by Fowler have now been placed in the United States National Museum.

HOLACANTHUS ASFUR (Forskål)

Chaetodon asfur FORSKÅL, Descript. Animal., 1775, pp. XII, 61. Lohaja, Red Sea.—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1267 (Arabia).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 406 (copied).—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 219 (Arabia).

Chetodon asfur BONNATERRE, Tabl. Ichth., 1788, p. 88 (Red Sea).

Pomacanthus asfur LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 518, 522 (Arabia).

Holacanthus asfur RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 132, pl. 34, fig. 2 (Red Sea).—CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 174 (Lohaja).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 45 (Red Sea).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 37 (Zanzibar, Aden).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 789 (Red Sea); Fische Roth. Meer., 1889, p. 60, pl. 8, fig. 2.

Chaetodon maculosus FORSKÅL, Descript. Animal., 1775, pp. XIII, 62. Lohaja, Red Sea.—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1267 (Arabia).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 415 (on FORSKÅL).—SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 220 (Arabia).

Holacanthus maculosus CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 176 (Lohaja).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 45 (Red Sea).—KOSSMANN and RÄUBER, Zool. Ergebn. Akad. Wiss. Berlin, Roth. Meer,. 1877, p. 14.—KLUNZINGER, Fische Roth. Meer., 1884, p. 61, pl. 8, fig. 1 (Australia and Koseir).

Holacanthus aruset LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 528, 537. Arabia.

Holacanthus coerulescens RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 133. Red Sea; Neue Wirbelthiere, Fische, 1835, p. 31 (name).

Holacanthus lineatus RÜPPELL, Atlas Reise nördl. Afrika. Fische, 1828, p. 133. Massaua, Red Sea; Neue Wirbelthiere, Fische, 1835, pp. 31, 32, 36, pl. 10, fig. 1.

Holacanthus haddaja CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 175. Massaua.

Holacanthus mokhella (EHRENBERG) CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 177. Massaua.

D. XI or XII, 21 or 22; A. III, 19 to 21; both fins well produced. Dark brown or brownish-gray, with lighter vertical band from hind half of spinous dorsal. Front part of body with black semilunar spots. Caudal yellowish. (Günther.)

Reaches 420 mm. according to Klunzinger.

HOLACANTHUS SEXSTRIATUS Cuvier

Holacanthus sexstriatus (KUHL and VAN HASSELT) CUVIER, Hist. Nat. Poiss., vol. 7, 1831, p. 194. Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 49 (Molucca Sea).—KNER, Reise Novara, Fische, 1865, p. 104 (Java).—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 388 (Singapore).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 277 (Cape Grenville).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 68, pl. (10) 372, fig. 4 (Singapore, Java, Celebes, Amboina).—MACLEAY, Proc. Linn. Soc. New South Wales, vol. 2, 1878,

p. 352 (Port Darwin).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Singapore).—Macleay, Proc. Linn. Soc. New South Wales, vol. 7, 1882, p. 244 (New Guinea).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Macassar, Celebes).—Düncker, Mitt. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 151 (Singapore).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 105 (Darnley Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 84 (Ambil Island, Tagapula, Bantayan, Tandubas, Cebu).

Chaetodon resinus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 71. Indian Ocean.

Depth 1¾ to 1⅘; head 3⅕ to 3⅗, width 1¾ to 2. Snout 2 to 2⅓ in head from upper jaw tip; eye 2⅞ to 5⅓, 1⅕ to 2⅘ in snout, 1 to 1⅗ in interorbital; maxillary extends about ⅖ in snout length, in small examples to point about ⅗ or opposite front nostril, 3⅓ to 3⅘ in head; interorbital 3 to 3⅔, broadly convex; preopercle spine along inner edge 2⅔ to 4. Gill rakers 5+13, short, obtuse points about ¼ of gill filaments, which equal eye.

Scales 50 to 63 counted along and above lateral line to caudal base; tubular scales 50 to 52; 7 or 8 scales above lateral line, 25 or 26 below. Scales with 7 basal radiating striae, obsolete with age; apical denticles 50 to 87, each with long slender root; circuli fine, strong.

D. XIII, 19, I or 20, I, last spine 1⅕ to 1½ in total head length, seventh ray 3⅛ to 3¼ in combined head and body; A. III, 18, I or 19, I, third spine 1½ to 2¼ in total head, ninth ray 1⅒ to 1⅙; least depth of caudal peduncle 2 to 2¾; caudal convex behind, 1⅕ to 1⅖; pectoral 1⅒ to 1¼; ventral 2¼ to 2⅖ in combined head and body.

Generally dull brown, with six dusky brown vertical bands, slightly arched forward and second, fourth, and sixth slightly wider. Each scale on body with round dark blue spot. Pale or buff transverse band from close before dorsal down to hind eye edge and variably as low as base of preopercle spine. On head and chest dark blue spots few and scattered, though traces of many smaller pale blue ones. Iris brown. Edges of vertical fins all narrowly blue with dark submarginal line; soft fins all closely spotted with blue. Paired fins dark or dusky brown, inner ventral rays paler.

East Indian region, previously largely known from a few of the East Indies, Queensland and Singapore. Variably the coloration changes with age. Our small examples show the white band on the head extended below on the side of the breast, sometimes nearly to the ventral origin where they meet. Also sometimes 2 or 3 transverse blue lines from last dorsal rays down over caudal peduncle to last anal rays. The smallest examples also have 2 transverse blue lines on the caudal basally followed by a single blue spot posteriorly. They also have but few blue spots on soft dorsal and anal, though in addition a blue median frontal line and 2 blue lines on the muzzle, one from front of eye and the other from the maxillary. These lines may all meet below and form a median blue line on the chest and breast.

According to Bleeker it would reach 500 mm. but none of our examples are so large.

4832, 8675. Biri Channel. June 2, 1909. Length 95 to 197 mm.
5671, 5674. Busin Harbor, Burias Island. April 23, 1908. Length 172 to 180 mm.
894. Busin Harbor. March 7, 1909. Length 97 mm.
285, 616. Busin Harbor. March 8, 1909. Length 80 to 110 mm.
3619. Cataingan Bay, Masbate Island. March 14, 1909. Length 110 mm.
5523. Catbalogan, Samar. April 15, 1908. Length 298 mm. Side of body pale dusky cadmium, becoming grayish above and below posteriorly, more dusky anteriorly. Side crossed by 6 dusky bars, ground color nearly sepia; on yellow ground centers of scales with dark cobalt blue, nearly slaty on dark bars. Front of head black. Opercle black, edges of scales dark green and black flap with scale edges green. From nuchal region downward behind eye soiled white bar, lower portion bluish. Breast dark olive with scattered dashes or spots of slate. Iris black. Dorsal pale dusky yellow, lighter than body anteriorly; terminal portions of spines pale blue on first 6 spines; remainder of fin posteriorly margined with blue, vertical edge becoming ultramarine blue and vertical portion of fin pale white thickly spotted with cerulean blue. Anal olive, more or less orange on vertical portion, tips of spines and margin of anal ultramarine, spots somewhat larger on vertical anal than on vertical dorsal. Caudal olive, edges and tip of fin ultramarine. Vertical fins narrowly edged black. Paired fins black.
8288. Canmahala Bay, Luzon. March 11, 1909. Length 323 mm.
7745. Caxisigan Island, Balabac. January 2, 1909. Length 390 mm.
5378. Cebu market. April 5, 1908. Length 360 mm.
7504. Endeavor Strait. December 22, 1908. Length 197 mm.
7270. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 122 mm.
4752. Lianga Bay. May 11, 1908. Length 120 mm.
6048, 6049. Little Santa Cruz Island. May 28, 1908. Length 205 to 295 mm.
343. Makesi Island. April 5, 1909. Length 150 mm.
7388. Port Caltom, Busuanga. December 15, 1908. Length 210 mm.
A533. Tambul Sigambul. September 14, 1909. Length 290 mm.
A1344. Labuan Blanda Island. December 14, 1909. Length 380 mm.
57497 U.S.N.M. Japan. P. L. Jouy. Length 156 to 180 mm. Two examples.

HOLACANTHUS LORICULUS Günther

Holacanthus loriculus GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 53, pl. 40, fig. C. Society Islands.—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Johnston Island).

Yellow, with 5 vertical blackish bands, first twice width of others. Small scattered blackish spots on back above lateral line. Soft dorsal and anal with hind half of each lobe blackish. Length 93 mm.

HOLACANTHUS MULTIFASCIATUS Smith and Radcliffe

Holacanthus multifasciatus SMITH and RADCLIFFE, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 324, fig. 3. Port Galera, Mindoro, Philippines. (Romblon Harbor; Mabul Island, Borneo; Buka, Dodepo and Pasejogo Islands, Binang Unang Island, Gulf of Tomini, Celebes; Uki, Buro; Talisse Island, Dutch East Indies).—HERRE and MONTALBAN Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 86, pl. 17, fig. 2 (copied).

Depth $1\frac{3}{5}$ to $1\frac{3}{4}$; head $2\frac{3}{4}$ to $3\frac{1}{4}$, width $1\frac{4}{5}$ to 2. Snout $2\frac{1}{2}$ to $3\frac{1}{5}$ in head; eye $2\frac{2}{5}$ to $2\frac{3}{5}$, slightly longer than snout or interorbital; maxillary reaches opposite front nostril, to eye in young, $3\frac{3}{4}$ to $3\frac{4}{5}$ in head; interorbital $3\frac{3}{5}$ to $3\frac{4}{5}$, broadly convex; preopercular spine along upper edge $2\frac{2}{5}$ to $3\frac{4}{5}$. Gill rakers $4+11$, robust, lanceolate, $\frac{1}{3}$ of gill filaments, which $\frac{1}{2}$ of eye.

Scales 33 to 46 between gill opening and caudal base; 7 or 8 scales above lateral line, 20 or 21 below. Scales with 5 to 7 basal marginal striae; apical denticles 16 to 18, each with long slender rootlet; circuli fine.

D. XIII, 16, I or 17, I, last spine $1\frac{1}{4}$ to $1\frac{1}{3}$ in head, fifth ray $1\frac{1}{10}$ to $1\frac{1}{4}$; A. III, 16, I or 17, I, third spine $1\frac{1}{3}$ to $1\frac{2}{5}$, sixth ray 1 to $1\frac{1}{6}$; least depth of caudal peduncle $2\frac{1}{6}$ to $2\frac{1}{3}$; caudal rounded convexly behind, 1 to $1\frac{1}{8}$; pectoral $2\frac{1}{2}$ to $3\frac{1}{3}$ in combined head and body; ventral $2\frac{1}{3}$ to $2\frac{3}{4}$.

General color pale brown, inclining to whitish, especially below. Ten seal-brown regular transverse bands, wide as interspaces and extending on soft dorsal and anal. In young but 7 transverse seal-brown regular bands, also equally wide as interspaces. All dark bands slightly broader above. Median seal-brown front band. Caudal with about 6 transverse seal-brown bands, much narrower than body bands, all more or less broken variable and several of outer series with appearance of spots; caudal with broad pale uniform border behind. Ocular seal-brown band crosses iris, which otherwise pale, below much broader than above eye and diffuse. Paired fins and spinous anal whitish or uniformly pale.

Known from the East Indies and Philippines. Our series shows the species variable in color pattern, sometimes anterior bands broken or irregular. In small examples a tendency to form small black ocellus at apex of soft dorsal.

449 [2022] (67355 U.S.N.M., type), 4708. Port Galera, Mindoro. October 27, 1909. Length 67 to 93 mm.

4825. Romblon Harbor. March 25, 1908. Length 66 mm. Dark bars seal brown, interspaces pale olive, become gray below; dark becomes yellow through cadmium. Circumoral band yellow, tinged with cadmium above. Tips of dorsal spines and soft dorsal white, edges of incised spinous membranes black. Anal posteriorly tipped with dusky; spines and membranes sulphur yellow; produced rays white. Pectoral dusky hyaline with greenish tinge.

8886, 9661, 9662, 2016. Mabul Island. September 29, 1909. Length 72 to 85 mm. Ground color pearl gray, slightly paler below, crossed by bars slightly wider above than below, not quite equal to orbit in widest part and about equal to interspaces; bars dark brown, below merging into orange. Circumoral ring orange, snout and chin dusky; short stripe of brown between eyes; ocular bar with orange below eye, joined at breast immediately before ventral short stripes at bases of branchiostegals; third bar from third dorsal membrane, fourth from fifth, fifth from seventh, sixth from ninth, seventh from tenth, eighth from behind last dorsal spine crosses base of caudal peduncle and extends across anal diagonally forward; short brown stripe through middle of soft dorsal and black blotch in brown area near middle margin. Bars on anal mostly orange. Caudal with row of small basal spots, rays more or less spotted with dusky and 2 other bars cross caudal peduncle. Pectoral hyaline. Ventrals cadmium yellow, tips white.

21525. Talisse Island. November 9, 1909. Length 40 mm.

3928. Uki, Bouro Island, Dutch East Indies. December 9, 1909. Length 82 mm.

4727. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 83 mm.

7979. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 71 mm.

13630. Una Una Road, Binang Unang Island, Gulf of Tomini, Celebes. November 18, 1909. Length 63 mm.

HOLACANTHUS BISPINOSUS Günther

Holacanthus bispinosus GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 48 (on BLEEKER); p. 516 (Aneiteum, New Hebrides, and Amboyna); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 51, pl. 56, fig C (Hawaii and Tahiti, also above examples).—BLEEKER, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 60, pl. (6) 368, fig. 1 (Amboyna).—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 421 (Ternate).—JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 378, pl. 56 (from Pago Pago example, not description).—JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 384 (2 Pago Pago examples).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 311. Banda).

Holacanthus diacanthus (not BODDAERT) BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. (5) 57 (Amboyna).

Centropyge tutuilae JORDAN and JORDAN, Mem. Carnegie Mus., vol. 10, No. 1, 1922, p. 62, pl. 3, fig. 2. Tutuila, Samoa.

Depth 1½ to 1⅘; head 3⅛ to 3⅔, width 1⅓ to 1⅖. Snout 3⅒ to 3⅕ in head; eye 2½ to 3, greater than snout, 1 to 1⅛ in interorbital; maxillary reaches opposite eye, 3½ to 3⅗ in head; interorbital 2⅘ to 3⅕, broadly convex; preopercle spine along upper edge 2⅘ to 4; anterior preopercle spine below well advanced in young and close before large spine with age; preopercle serrae small in young, become variably larger with age. Gill rakers 5 + 16, well compressed, elongately triangular, lanceolate, ½ of gill filaments which 1½ in eye.

Scales 36 to 40 counted between gill opening and caudal base; 6 or 7 scales above lateral line, 17 or 18 below. Scales with 5 to 9 basal striae, marginal and edge scalloped; apical denticles 20 to 30, each with single long rootlet; circuli very fine.

D. XIII or XIV, 15, I to 17, I, last spine 1⅓ to 1⅗ in head, tenth ray 1⅙ to 1¼; A. III, 16, I or 17, I, third spine 1⅓ to 1⅔, sixth ray 1¼ to 1⅓; least depth of caudal peduncle 2 to 2⅒; caudal rounded convexly behind, 1 to 1⅛; pectoral 3 to 3⅖ in combined head and body; ventral 2⅗ to 3⅛.

Back dark brown, also upper surface of head, becoming pale on sides and belly. Iris brown. About 17 to 20 dusky to blackish-brown transverse lines, inclined little forward, variably broken though some few more or less broken as spots. In small examples dark bands become little broader on caudal peduncle and base of caudal, also extend up on dorsals and anals but curving forward. Soft vertical fins with deep blue border and submarginal blackish line, and in young against submarginal blackish line rather broad brownish band. Pectorals mostly pale or yellowish, occasionally variable dusky. Ventrals pale, terminally with dusky margin.

East Indies, Melanesia, and Polynesia. Though Günther reports it from Hawaii through Garrett, likely this may have been the form later described by Jordan and Metz as *Holacanthus potteri*. We have therefore compared the type of *Holacanthus potteri* with this series of Philippine examples and find that it appears to differ chiefly in a slightly more barred color-pattern. In *Holacanthus bispinosus* the bands do not extend across the breast, head and predorsal region. Of this we are, however, not absolutely certain, as the resulting color may in various degrees be due to the action of formaline. The type of *Holacanthus potteri* is very pale brown with dull cross bands or lines, only the soft vertical fins at all dark or dusky, the caudal alone showing no trace of darker bands. Now in our small examples these dark cross bands are very conspicuous on the caudal of *Holacanthus bispinosus*. There are also traces of them in some of the large examples. There are also traces in some specimens at least, of dark or light transverse bands on the side of the head, as in *Holacanthus potteri*, though few if any across the predorsal or breast. Also, in view of this and other examples of *Holacanthus potteri* that we have examined in all stages from freshly caught specimens to those long in alcohol, we have come to the conclusion that it is a very closely allied species. The armature of the preorbital and preopercle as contended by Jordan and Jordan, are not valid characters. Our series show them simply as variants, evidently due to age or the individuals. We can find nothing to distinguish the nominal *Centropyge tutuilae*.

21848. Limbones Cove. February 8, 1909. Length 85 mm. [1115].
3633. Maribojoc Bay, Bohol Island. March 26, 1909. Length 82 mm.
3896. Opol, Mindanao. August 4, 1909. Length 91 mm.
19069. Paluan Bay, Mindoro. December 11, 1908. Length 97 mm.
22250. Port Matalvi, Luzon. November 22, 1908. Length 80 mm.
22261. Tapiantana Island. September 13, 1909. Length 84 mm.
22160. Tutu Bay, Jolo Island, first anchorage. September 19, 1909. Length 59 mm.
7974. Tutu Bay. September 19, 1909. Length 88 mm.
21458, 22825. Danawan and Si Amil Islands. September 27, 1909. Length 62 to 72 mm.

8887. Mabul Island. September 29, 1909. Length 82 mm.
10767. Sipadan Island. November 28, 1909. Length 95 mm.
14404, 14405. Talisse Island. November 9, 1909. Length 82 to 95 mm.
14490. Tomahu Island. December 12, 1909. Length 62 mm.
467, 4834. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909 Length 68 to 71 mm.
22304. Tidore Island, south of Ternate. November 29, 1909. Length 75 mm.
One example. Doworra Island. December 2, 1909. Length 90 mm.
21518. Doworra Island. December 2, 1909. Length 56 mm.

HOLACANTHUS POTTERI Jordan and Metz

Holacanthus potteri Jordan and Metz, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 525, pl. 71, fig. 1. Honolulu.—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (French Frigate Shoals).

A very handsome species closely related to *Holacanthus bispinosus*, differing only in the more distinct transverse dark bands and therefore more contrasted color pattern.

73911 U.S.N.M. Honolulu. F. A. Potter. Type.

HOLACANTHUS MULTISPINIS Playfair

Holacanthus multispinis Playfair, Fishes of Zanzibar, 1866, p. 37, pl. 6, fig. 4. Zanzibar.

Holacanthus somervillii Regan, Trans. Linn. Soc. London, vol. 12, ser. 2, pt. 3, 1908, p. 228, pl. 24, fig. 6. Coetivy, Seychelles Group.

Snout very obtuse. Interorbital with 2 to 4 spines, posterior longest and longer than additional preopercular spines. Preopercle spine flat, smooth, reaches pectoral base; smaller spine in front. Suborbital strongly denticulated. Scales 47 in lateral line. D. XIV, 16; A. III, 17; soft dorsal and anal subrhomboid, not elevated.

Uniform dark silky brown or black. In life deep brown, darker anteriorly, with numerous black wavy bands, some interrupted. Blue longitudinal band parallel to anal. On shoulder black blotch with bluish border. Dorsal with black basal band and 2 similar parallel ones on soft portion. Anal with 3 dark parallel bands and brilliant blue edge. Pectoral black. Ventral with first membrane blue. Length 139 mm. (Playfair.)

Quite likely *Holacanthus somervillii* is the young, as it is based on an example but 64 mm. long.

HOLACANTHUS FISHERI Snyder

Holacanthus fisheri Snyder, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 532, pl. 11, fig. 21. Off Diamond head, Oahu, in 27 to 29 fathoms; south of Molokai; between Maui and Lanai; off southern Oahu in 14 to 43 fathoms.

?*Holacanthus acanthops* Norman, Ann. Mag. Nat. Hist., ser. 9, vol. 9, 1922, p. 318. Natal.

Reddish-orange in life, tinged dusky behind. Diffuse black blotch above pectoral. Dorsal narrowly edged black. Anal broadly blackish behind, edge narrowly blue. Caudal yellow medially. Pectoral orange. Ventral orange, dusky marginally, spine and first ray pearl-blue. Length 83 mm.

50881 U.S.N.M. Station 4032, Hawaiian Islands. *Albatross* collection. Type.
55318 U.S.N.M. South coast of Oahu. *Albatross* collection. Three paratypes.
55319 U.S.N.M. Between Maui and Lanai. *Albatross* collection. Six examples.
55320 U.S.N.M. South coast of Oahu. *Albatross* collection. Paratype.
76359 U.S.N.M. Hawaii. *Albatross* collection. Three paratypes.

HOLACANTHUS LEPIDOLEPIS Bleeker

Holacanthus lepidolepis Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 468. Batavia, Java.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 47 (copied).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 103, pl. 23, fig. 1 (Ambil Island and Bato Bato).

Acanthochaetodon lepidolepis Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 67, pl. (10) 372, fig. 1 (Batavia).

Holacanthus ignatius Playfair, Proc. Zool. Soc. London, 1867, p. 852, pl. 41. Seychelles.

Holacanthus poecilus Peters, Monatsber. Akad. Wiss. Berlin, 1868, p. 454. Zanzibar.

Depth $1\frac{1}{2}$ to $1\frac{3}{5}$; head $3\frac{1}{4}$ to $3\frac{3}{4}$, width $1\frac{2}{3}$ to $1\frac{4}{5}$. Snout $2\frac{1}{8}$ to $2\frac{3}{5}$ in head from snout tip; eye $3\frac{1}{5}$ to 5, $1\frac{1}{5}$ to $1\frac{2}{3}$ in snout, 1 to $1\frac{7}{8}$ in interorbital; maxillary reaches nearly half way in snout, nearly to front nostril, 3 to $3\frac{2}{5}$ in head; interorbital $2\frac{7}{8}$ to $3\frac{4}{5}$, broadly convex; preopercle spine along inner edge $2\frac{1}{2}$ to $4\frac{1}{5}$. Gill rakers 5 + 13, very short, small points, about $^1/_7$ of gill filaments, which slightly longer than eye.

Scales 70 to 75 counted close along and above lateral line to caudal base; tubular scales about 50 to 56; 13 scales above lateral line, 33 or 34 below. Scales with 3 to 8 basal radiating striae; apical denticles 25 to 45, each with long slender root; circuli fine.

D. XIII, 21, i or 22, i, last spine $1\frac{1}{4}$ to 2 in total head length, seventh ray $2\frac{1}{5}$ to $2\frac{7}{8}$ in combined head and body; A. III, 19, i or 20, i, third spine $1\frac{2}{5}$ to $2\frac{1}{8}$ in head, fifth ray $2\frac{1}{4}$ to $2\frac{3}{4}$ in combined head and body; least depth of caudal peduncle 2 to $2\frac{1}{5}$ in head; caudal convex behind, $1\frac{1}{8}$ to $1\frac{1}{3}$; pectoral 1 to $1\frac{1}{10}$; ventral $2\frac{1}{3}$ to $3\frac{2}{5}$ in combined head and body.

Largely uniform brown, though median area slightly paler. On trunk and tail most of larger scales each with large dark slaty or bluish spot. Iris brown. Border of gill-cover narrowly, also preopercle border narrowly and preopercle spine slaty-bluish. Soft vertical fins, intervening region of tail and caudal peduncle all finely dotted with pale brown, dots not invading dark spots; edges of vertical fins also narrowly bluish; in young pale bluish bars are formed vertically from bases of soft dorsal and anal over caudal peduncle and caudal base, also vertical fins with fewer and much larger blue spots. Pectoral brown. Ventral dusky brown and with bluish tinge along front edge.

Seychelles, East Indies. The adults or old examples have the soft dorsal and anal fins produced in rather long points, so that both extend backward beyond the end of the tail. Bleeker had but 2 examples 220 to 326 mm. long. In our small examples the head as well as the trunk is often pale in contrast with the rest of the body. Superficially the adult coloration, in pattern, is quite suggestive of the American *Pomacanthus arcuatus*. Our smallest example also shows a narrow gray-white line from occiput to base of preopercle spine and then back to ventral origin, bluish median line on front, one from occiput to front eye edge and down over front of cheek, also one vertically down on opercle posteriorly.

8936. Atulayan Island, Lagonoy Gulf. June 18, 1909. Length 230 mm.
8839. Maculabo Island. June 14, 1909. Length 212 mm.
3910. Makesi Island, Palawan. April 5, 1909. Length 148 mm. [1497].
7087. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 234 mm.
11401. Sabtan Island. November 8, 1908. Length 123 mm.
9120, 9121. San Roque, Leyte Island. July 29, 1909. Length 155 to 187 mm.
A616. Singaan Island. September 21, 1909. Length 233 mm.
A1458, A1459. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 395 to 410 mm.
A1580. Soo Wan, Eastern Formosa. January 29, 1910. Length 178 mm.

HOLACANTHUS SEMICIRCULATUS Cuvier

Holacanthus semicirculatus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 191, p. 183. Timor, Buru, Waigui, Port Praslin, New Ireland.—Lesson, Voy. Coquille, Poiss., vol. 2, pt. 1, 1830 (1831), p. 173, pl. 30, fig. 3 (Port Praslin, New Ireland; Offack Bay, Waigiu; Cajeli Bay, Buru).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 53 (Fiji, Amboina).—Martens, Preuss. Exp. Ost-Asien, 1876, p. 388 (Amboina).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Rubi, New Guinea).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 489 (Mindoro).—Jatzow and Lentz, Abh. Senckenb. Naturf. Ges., vol. 21, Heft 1, 1897, p. 503 (Bawiklippe, Zanzibar).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Saonek, Waigui).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 311 (Lombok, Saleyer, Amboina, Elat, Rotti).—Pellegrin, Bull. Soc. zool. France, vol. 39, 1914, p. 227 (Diégo Suarez, Madagascar).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 110 (Queensland).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 100, pl. 19, fig. 1 (Palawan).

Holacanthus nicobariensis var. *semicirculatus* Day, Fishes of India, pt. 1, 1875, p. 112, pl. 28, fig. 6.

Acanthochaetodon semicirculatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 69, pl. (8) 370, fig. 5 (Sumatra, Java, Celebes, Timor, Buru, Ceram, Amboina, Goram, Waigiu).

Holacanthus semicircularis De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884, p. 457 (Queensland).

Holacanthus alternans Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 193. Madagascar.—Playfair, Fishes of Zanzibar, 1866, p. 38 (Zanzibar and Aden).—Pellegrin, Bull. Soc. zool. France, vol. 39, 1914, fig. 227 (Fort Dauphin, Madagascar).

Holacanthus coeruleus (Ehrenberg) Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 194. Massaua.—Klunzinger, Fische Roth. Meer., 1884, p. 61.

Holacanthus striatus Rüppell, Neue Wirbelthiere, Fische, 1835, p. 32, pl. 10, fig. 2.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 53.—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 616 (Natal).

Acanthochaetodon striatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 68, pl. (8) 370, fig. 3.

Chaetodon microlepis Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 257. Cauer, Sumatra.

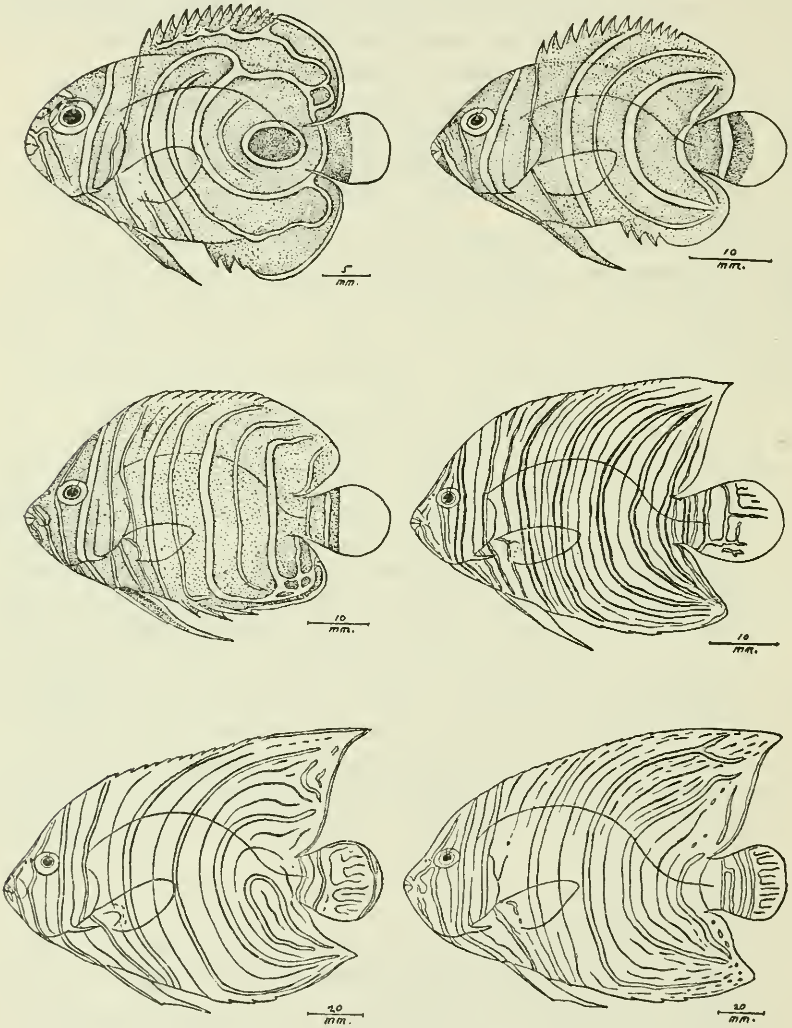
5 mm.
10 mm.
10 mm.
10 mm.
20 mm.
20 mm.

Fig. 9.—Holacanthus nicobariensis (Schneider). Uppermost left figure. All others Holacanthus semicirculatus

Holocanthus iburu (Montrouzier) Thiollière, Fauna Woodlark, 1859, p. 169 (name in synonymy).

Holocanthus alternans var. *meleagris* Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, 1896, p. 303. Palk Straits.

Holacanthus nicobariensis (not Schneider) Jordan and Seale, Bull. Bur. Fish. vol. 25, 1905, (1906), p. 349 (Pago Pago).

Holacanthus rhomboides Gilchrist and Thompson, Ann. South Afric. Mus., vol. 6, 1908, p. 161. Natal.

Depth 1⅔ to 1¾; head 2¾ to 3⅓, width 1⅞ to 2. Snout 2⅘ to 3 in head from snout tip; eye 3½ to 3⅘, 1 to 1⅓ in snout, greater than interorbital; maxillary to front nostril in vertical, 3¼ to 3½ in head; interorbital 3⅘ to 4⅕, broadly convex; preopercle spine along upper edge 3⅘ to 6¾, much shorter in very young. Gill rakers 6 + 12, lanceolate, short, ⅓ of gill filaments, which 1½ in eye.

Scales 65 to 70 between gill opening and caudal base; 12 or 13 scales above lateral line, 34 or 35 below. Scales with 3 to 6 basal radiating striae; apical denticles 21 to 34, each with rather slender, moderately long rootlet and 3 or 4 series transversely of small basal spinelets; circuli fine.

D. XIII, 20, I to 21, I, last spine 1¼ to 1½ in total head length; seventh ray 2⅖ to 2¾ in combined head and body; A. III, 18, I or 19, I, third spine 1⅞ to 2 in total head length, sixth ray 1 to 1⅛; least depth of caudal peduncle 2⅛ to 2⅗; pectoral 1⅛ to 1⅙; ventral 2¾ to 2⅞.

Largely blackish-brown, with age becoming little paler or more brownish on sides medially and abdomen. Eighteen transverse or vertically-placed whitish lines, variably arched or with upper and lower portions inclined backwards, those on tail posteriorly usually greatly curved; usually first, second, fourth, sixth, eighth, tenth, twelfth, fourteenth, sixteenth, and eighteenth much wider. In young these wider bands the only ones present, the intervening ones gradually appearing with age; the alternating lines always conspicuously narrower than the fundamentals; also intervening brown areas on middle of trunk and front of tail with many close-set, small, dusky or blackish spots in adults. Light lines all extend to vertical fins, variably converging more or less as broken bars and spots on soft dorsal and anal. Caudal dusky brown with 2 whitish transverse basal lines, variously broken as [-shaped. Borders of soft vertical fins all narrowly bluish. Pectoral brownish. Ventral dusky, front border blue and several blue lines. Young with outer half of caudal uniformly pale. Iris dusky.

Zanzibar, East Indies, Melanesia, Polynesia. A very handsome species though the light lines variable. In one of our adult examples the fourteenth loops over before the caudal peduncle and joins with the sixteenth on the left side of the body. In a young example the posterior whitish lines are nearly straight and parallel on the tail, though oblique on the vertical fins. As Ogilby says it is a small species though our largest example is considerably more than his, as 120 mm. compared with 165 mm.

19469. Batan Island. July 22, 1909. Length 45 mm.
8507. Entrance Puerta Princesa Bay. April 5, 1909. Length 165 mm.

1692. Gubat Bay, Luzon Island. June 23, 1909. Length 40 mm.
469. Hinunangan Bay, Cabugan Island. July 30, 1909. Length 138 mm.
4716. Lampinigan Island. September 11, 1909. Length 59 mm.
One example. Nasugbu. January 16, 1908. Length 17 mm.
One example. Sablayan, Mindoro. December 13, 1908. Length 25 mm.
One example. Singaan Island. September 21, 1909. Length 21 mm.
43943 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 134 mm.
52247 U.S.N.M. Samoa. Bureau of Fisheries. Length 38 mm. As *Holocanthus nicobariensis.*

HOLACANTHUS CHRYSURUS Cuvier

Holacanthus chrysurus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 188. No locality (on Gaimard).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 54 (copied).—Playfair, Fishes of Zanzibar, 1866, p. 38 (Aden and Zanzibar).

D. XIII, 19, fin slightly pointed. A. III, 19. Brown. Blue line from neck round eye toward mouth emitting 3 other lines to interopercle edge; vertical line on preopercle extends before pectoral to ventral base; third on chest; body with 6 arched whitish lines, alternately broader and narrower, extend over dorsal and anal; several other indistinct lines in interspaces between those described. Caudal yellow, with fine marginal lines. Length 127 mm. (Cuvier.)

Possibly not different from *Holacanthus semicirculatus.*

HOLACANTHUS NICOBARIENSIS (Schneider)

Chaetodon nicobariensis Schneider, Syst. Ichth. Bloch, 1801, p. 219, pl. 50. Nicobars.

Holacanthus nicobariensis Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 52 (copied); Cruise, of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 54, pl. 41, fig. B (Samoa, Society Islands).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 438 (Mauritius).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Singapore).—Day, Fauna Brit. India, vol. 2, 1889, p. 16.—Vaillant, Nouv. Arch. Mus. Paris, ser. 3, vol. 5, 1893, p. 57 (Palawan).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 311 (Banda).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 98 (Guam, Calapan).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 615 (Mozambique; not synonymy).

Acanthochaetodon nicobariensis Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1878, p. 69, pl. (3) 365, fig. 1 (Timor, Amboina, Ceram, Waigu).

Holacanthus geometricus Lacépède, Hist. Nat. Poiss., vol. 4, 1804, pp. 528, 535, pl. 13, fig. 1 (on *Douwing formose* Renard, Poiss. Moluques, vol. 1, 1718–19, pl. 5, fig. 34. Moluccas).—Cuvier, Nat. Poiss., vol. 7, 1831, p. 189 (compiled).

Holacanthus bishopi Seale, Occas. Papers Bishop Mus., vol. 1, No. 3, 1900, p. 106. Agaña, Guam.

Distinguished from *Holacanthus semicirculatus* by the lines circular on the body, at least largely so in the young, with age the circles more or less posterior.

Mauritius, Nicobars, East Indies, Micronesia, Polynesia.

HOLACANTHUS IMPERATOR (Bloch)

Chaetodon imperator Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 51, pl. 194. Japan.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1255 (Japan).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 415 (on Bloch).—Forster, Fauna Indica, 1795, p. 15.—Schneider, Syst. Ichth. Bloch, 1801, p. 217 (Japan).

Chetodon imperator Bonnaterre, Tabl. Ichth., 1788, p. 92, pl. 93, fig. 384 (Japan).

Holacanthus imperator Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 527, 534, pl. 4, fig. 3 (Japan).—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 180 (Moluccas, Mauritius).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 52 (Ceylon, Amboina).—Playfair, Fishes of Zanzibar, 1866, p. 38 (Zanzibar).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 20, 1870, p. 787 (Red Sea).—Günther, Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Molucca); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 53, pl. 41, fig. A (Society Islands and Paumotus).—Bleeker, Ned. Tijds. Dierk., vol. 4, 1874, p. 117 (China).—Day, Fishes of India, pt. 1, 1875, p.112, pl. 28, fig. 5.—Klunzinger, Fische Roth. Meer., 1884, p. 61.—Meyer An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 17 (Manado, Celebes).—Day, Fauna Brit. India, vol. 2, 1889, p. 15, fig. 5.—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 313 (Macassar).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 11 (Oman).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 108 (Raine Island).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, p. 97, pl. 23, fig. 2 (Calapan, Puerto Galera, Batangas, Basbas).

Acanthochaetodon imperator Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 70, pl. (5) 367, fig. 2, pl. (12) 374, fig. 4 (Celebes, Amboina, New Guinea).

Holacanthas marianus Seale, Occas. Papers Bishop Mus., vol. 1, No. 3, 1900, p. 140. Agaña, Guam.—Jordan and Dickerson, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 615, fig. 6 (Fiji).

Depth 1⅗ to 1⅘; head 3¼ to 3⅔, width 1⅗ to 1⅘. Snout 2⅒ to 2⅕ in head from snout tip; eye 4 to 4⅓; 1⅘ to 2 in snout, 1⅖ to 1⅗ in interorbital; maxillary extends about half way in snout length, not quite to front nostril, 3⅒ to 3⅓ in head; interorbital 3 to 3⅒, broadly convex; preopercle spine along inner edge 2⅘ to 3⅙. Gill rakers 7 + 13, short strong points, 5⅓ in gill filaments, which equal eye.

Scales 76 to 80 in obscure course of lateral line to caudal base; 13 scales above lateral line, 35 to 37 below. Scales with 2 to 4 basal radiating striae; apical denticles 29 to 36, each with long slender root; circuli fine.

D. XIII or XIV, 18, I to 20, I, last spine 1½ to 1¾ in total head length, sixth ray 3⅛ to 3¾; A. III, 18, I or 19, I, third spine 1⅘ to 2⅛ in head, ninth ray 1½; least depth of caudal peduncle 2¼ to 2⅞; caudal convex behind, 1⅖ to 1½; pectoral 1⅒ to 1⅛; ventral 1 to 1⅒.

Brown generally. Side with 19 to 24 pale yellowish-brown lines, inclined slightly superiorly, extending on soft dorsal and anal and on caudal peduncle to caudal base. Iris dark brown. Blackish-brown band across interorbital and down from eye posteriorly narrowing below until point at angle of preopercle spine and edges bordered with bluish lines. Another blackish-brown blotch upward from pectoral axil includes hind edge of opercle and humeral region, extending well above level of eye and reflected below and behind pectoral base; front edge with bluish bordering line and hind edge with yellow line giving off oblique yellowish lines of body. Edges of lips bordered with bluish. Spinous dorsal as exposed, soft dorsal marginally and all of caudal light yellowish-brown. Soft dorsal narrowly edged with blue and submarginal dusky line. No border to caudal. Anal much darker than trunk or tail, only longitudinal yellow bands curving along its extent; edge narrowly bluish and with dark submarginal line. Pectoral and ventral brownish, former with blackish base and latter with spine and membranes bluish.

Red Sea, Mauritius, Zanzibar, Ceylon, East Indies, Queensland, Micronesia, Polynesia.

A very striking species, easily known by its color-pattern. The oblique lines are not quite alike in any two specimens and moreover are different on either side of the body.

8093. Alimango Bay, Burias Island. March 5, 1909. Length 260 mm. Body alternately striped bright yellow and purple, yellow stripes about half width of pupil or nearly ⅓ of diameter of eye. Nuchal region and anterior back slaty or smoky, slightly more purplish on snout and cheek, dark brown on breast; black stripe across interorbital passes through eye, curves downward on posterior preopercle limb and bordered by bright purple lines equal in width to yellow body lines; large black area across shoulder including pectoral base, extends about half way between upper angle of gill opening and front of spinous dorsal and bounded on front by bright purple line passing down near hind opercle edge; posterior border of black not limited by yellow as shown in Bleeker's plate but the body stripes entirely meeting its margin or with very slightly expanded ends. Belly rusty brownish. Spinous dorsal white terminally, including all of first 2 spines and their membranes, white narrowing to marginal stripe on soft fin, extends nearly to tips of produced rays; lower portion of dorsal with body colors carried on, posterior part of vertical edge dull orange, extreme vertical margin narrowly blue on black submarginal line. Anal largely purplish, brown terminally; yellow body stripes invade fin and become purple on body; tips of spines and edge of fin bright purple, soft fin with very narrow black edge. Caudal cadmium orange, body stripes ending at its base. Pectoral black, membranes hyaline terminally. Ventral rays umber, spines purple at tip and membranes pale purplish.

A525. Bulan Island. September 13, 1909. Length 198 mm.

8507. Entrance to Puerta Princesa Bay. April 5, 1909. Length 160 mm.

6230. Medio Island, Galera Bay, Mindanao. June 9, 1908. Length 215 mm.

One example. Philippines. Length 140 mm.

8529. Verde del Sur Island. April 6, 1909. Length 204 mm.

A1208. Doworra Island. December 2, 1909. Length 270 mm.

A748. Sipadan Island. September 28, 1909. Length 230 mm.

43943 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 217 mm.

61679 U.S.N.M. Suva, Fiji. Dr. B. G. Corney.

HOLACANTHUS ANNULARIS (Bloch)

Chaetodon annularis Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 114, pl. 215, fig. 2. East Indies.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1262 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 425 (East Indies).—Forster, Fauna Indica, 1795, p. 15.—Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 178 (Pondichery, Moluccas, Malacca).

Chetodon annularis Bonnaterre, Tabl. Ichth., 1788, p. 91 (East Indies).

Holacanthus annularis Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 526, 533 (East Indies).—Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1146 (Pinang).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 42 (Ceylon, Moluccas).—Day, Fishes of India, pt. 1, 1875, p. 112, pl. 29, fig. 1; Fauna Brit. India, vol. 2, 1889, p. 16.

Acanthochaetodon annularis Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 71, pl. (8) 370, figs. 1–2 (Sumatra, Pinang, Singapore, Java, Celebes).—Bean and Weed, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 607 (Batavia).

Holacanthus septentrionalis (part) Richardson, Rep. Ichth. China Japan, 1846, p. 246.

Chaetodon resinus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 71. Indian Ocean.

Chaetodon vorticosus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 74. Indian Ocean.

Holacanthus pseudannularis Bleeker, Nat. Tijds. Ned. Indië, vol. 15, 1858, p. 168. Batavia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 43 (copied).

Greatly like *Holacanthus imperator* but differs in a blue humeral annulus. Known only from India and the East Indies.

72698 U.S.N.M. Batavia, Java. Bryant and Palmer. Length 230 mm.

HOLACANTHUS MESOLEUCUS (Bloch)

Chaetodon mesoleucus Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 117, pl. 216, fig. 2. Japan.—Walbaum, Arted. Pisc., vol. 3, 1792, p. 411 (on Bloch).—Schneider, Syst. Ichth. Bloch, 1801, p. 227 (Japan).

Chetodon mesoleucus Bonnaterre, Tabl. Ichth., 1788, p. 87 (Japan).

Holacanthus mesoleucus Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 528, 535 (Japan).—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 54 (Macassar and Moluccas).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 156 (Sarawak and Singapore).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 18 (Menado and Macassar, Celebes).—Düncker, Mitt. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 151 (Singapore).—Herre and Montalban, Philippine Journ. Sci., vol. 34, No. 1, Sep. 1927, pl. 7, fig. 1 (Puerto Galera, Masbate, Gigantangan, Estancia, Zamboanga, Bato Bato, Jolo).

Holacanthus mesoleucus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 170 (Moluccas, Java).—Kner, Reise Novara, Fische, 1865, p. 105 (Java, Singapore).

Chaetodontoplus mesoleucus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 56, pl. (7) 369, fig. 5 (Batu, Singapore, Duizend Islands, Java, Celebes, Halmaheira, Batjan, Obi major, Ceram).

Chaetodon mesomelas Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1263. Japan (on Bloch).—Forster, Fauna Indica, 1795, p. 15.

Chaetodon atratus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 54. India.

Depth 1⅗ to 1¾; head 3 to 3⅓, width 1⅘ to 2. Snout 3 to 3⅛ in head from snout tip; eye 3 to 3⅗, 1 to 1⅖ in snout, slightly greater than interorbital in young to 1⅖ in adult; maxillary reaches about opposite hind nostril, 3⅔ to 3⅘ in head; interorbital 3⅕ to 3¼, broadly convex; preopercle spine along upper edge 2½ to 4. Gill rakers 4+12, short robust points, ⅕ of gill filaments, which 1¼ in eye.

Scales 61 to 72 between gill opening and caudal base; 12 or 13 scales above lateral line, 23 to 28 below. Scales with 4 basal radiating striae; apical denticles 17 to 31, each with long slender rootlet; circuli fine.

D. XII, 17, i or 18, i, last spine 1¼ to 1⅔ in total head length, sixth ray 1⅓ to 1½; A. III, 17, i or 18, i, third spine 1⅖ to 1⅘, sixth ray 1¼ to 1¾; least depth of caudal peduncle 2¼ to 2¾; caudal rounded convexly behind, 1⅖ to 1½; pectoral 1⅓ to 1⅖; ventral 1 to 1⅛.

Trunk posteriorly and tail dusky brown, shading anteriorly pale brown to head. Iris brown. Broad dusky brown band from occiput includes eye and meets on breast its fellow, where also narrowing. Front of lips dusky brown. On trunk and tail many waved gray longitudinal lines, variously broken and irregular. Dorsals and anals dusky brown to blackish, like tail, with very narrow whitish edges. Caudal and paired fins pale like head.

East Indies. Our large series of this species shows it to be remarkably uniform and with but slight change with age.

1324, 12997. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 105 to 128 mm.

1288. Alimango Bay. March 5, 1909. Length 123 mm.

625. Bagacay Bay, Escarpada. March 13, 1909. Length 130 mm.

3607, 9004. Biri Channel. June 1, 1908. Length 78 mm.

757. Buang Bay, Talajit Island. March 15, 1909. Length 135 mm.

617, 618. Busin Harbor, Burias Island. March 8, 1909. Length 70 to 85 mm.

974, 9005. Busin Harbor, Burias Island. April 22, 1908. Length 90 to 110 mm.

818, 856, 857. Busin Harbor. April 23, 1908. Length 73 to 115 mm.

286, 287, 3610, 3620. Busin Harbor. March 8, 1909. Length 65 to 105 mm.

3622 and 3623. Butauanan Island. June 13, 1909. Length 78 to 92 mm.

1210, 3609. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 110 to 141 mm.

843 to 846, 1134. Cataingan Bay. April 18, 1908. Length 65 to 90 mm.

3587. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 96 mm.

944. Cebu market. April 5, 1908. Length 133 mm.

350, 9666. Endeavor Strait. December 22, 1908. Length 88 to 134 mm.

70, 1296, 1297. Endeavor Strait. December 23, 1908. Length 56 to 103 mm.

4670. Galvaney Island, Ragay Gulf. March 9, 1909. Length 106 mm.

21583. Guiniyan Island. June 4, 1909. Length 45 mm.

22843. Isabela, Basilan. September 11, 1909. Length 46 mm.

141, 785, 956, 957, 4768. Langao Point, Luzon. June 24, 1909. Length 75 to 135 mm.

4839. Little Santa Cruz Island. May 26, 1908. Length 116 mm.

1101, 1102. Little Santa Cruz Island. May 28, 1908. Length 138 to 145 mm.

648, 649. Lode Bay, Destacado Island. March 13, 1909. Length 105 to 125 mm.
1259. Makesi Island. April 5, 1909. Length 77 mm.
1084 to 1086. Masbate Reef, Masbate Island. April 20, 1908. Length 87 to 108 mm.
911, 9671. Masamat Bay, Quinalasag Island. June 12, 1909. Length 92 to 100 mm.
917. Nabatas Point, Samar Island. July 24, 1909. Length 120 mm.
445. Pandanon Island. March 23, 1909. Length 85 mm.
1316. Polloc. May 23, 1908. Length 125 mm.
355 to 357, 604. Port Caltom. December 15, 1908. Length 73 to 130 mm.
1019. Port Matalvi. November 22, 1908. Length 96 mm.
1187, 1188. Port Matalvi. November 23, 1908. Length 76 to 92 mm.
633. Port Tilig. July 15, 1908. Length 120 mm.
633, 739, 747. Port Uson, west of Pinas Island. December 17, 1908. Length 70 to 115 mm.
874. Ragay Bay. March 10, 1909. Length 67 mm.
729 [492]. Romblon. March 26, 1908. Length 108 mm.
545. San Juanico Strait. April 13, 1908. Length 70 mm.
4717 to 4719. San Miguel Harbor, Ticao Island. April 21, 1908. Length 83 to 107 mm.
733, 734. Santa Cruz, Marinduque. April 24, 1908. Length 90 to 121 mm.
4853, 4854, 9393 to 9395. Surigao, Mindanao. May 8, 1908. Length 67 to 113 mm.
4900. Talajit Island. March 15, 1909. Length 72 mm.
381. Tara Island. December 14, 1908. Length 150 mm.
592. Tara Island. December 15, 1908. Length 145 mm.
10400. Tilig. July 14, 1908. Length 129 mm.
898, 1057. Ulugan Bay, channel north of Oyster Inlet. December 28, 1908. Length 110 to 122 mm.
239. Ulugan Bay, Palawan. December 29, 1908. Length 95 mm.
513. Ulugan Bay, Rita Island. December 29, 1908. Length 88 mm.
551, 4735. Kayoa Island. November 29, 1909. Length 48 to 69 mm.
424. Togian Bay, Togian Island. November 19, 1909. Length 75 mm.
426, 427, 4729, 4730. Gane Road, Gillolo Island. December 1, 1909. Length 34 to 65 mm.

HOLACANTHUS SEPTENTRIONALIS Schlegel

Holacanthus septentrionalis SCHLEGEL, Fauna Japonica, Poiss., dec. 5–6, 1844, p. 82, pl. 44. Nagasaki, Japan.—RICHARDSON, Ichth. China Japan, 1846, p. 246 (China).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 52 (no locality).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 47, abth. 1, 1883, p. 24 (Tokyo).—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 52.—JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 756 (Yokohama).—JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 545 (Ikune, Kiusiu).

Holacanthus ronin JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 546, fig. 6. Misaki and Wakanoura, Japan.

A very handsome species easily known by its horizontal or longitudinal blue lines, variably narrow or broader and sometimes extending on soft dorsal more or less parallel with the fin rays, then forming the variety *ronin*.

China and Japan. Reaches 164 mm.

HOLACANTHUS CHRYSOCEPHALUS Bleeker

Holacanthus chrysocephalus Bleeker, Nat. Tijds. Ned. Indië, vol. 7, 1854, p. 428. Batavia.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 54 (copied).

Chaetodontoplus chrysocephalus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 56, pl. (6) 368, fig. 4 (type).

Differs from *Holacanthus mesoleucus* according to Bleeker in its deep golden color and absence of the black ocular band. Head, chest and trunk anteriorly with blue, irregular or waved horizontal lines. Dorsals with blue horizontal line and anal with 2 similar blue lines. Length 170 mm.

HOLACANTHUS DUBOULAYI Günther

Holacanthus duboulayi Günther, Ann. Mag. Nat. Hist., London, ser. 3, vol. 20, 1867, p. 67. Northwest coast of Australia.—McCulloch, Rec. Australian Mus., vol. 9, pt. 3, 1913, p. 360, pl. 14 (Rat Island, Port Curtis, and Cape York, Queensland).

Chaetodontoplus duboulayi Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 112 (Moreton Bay, Port Curtis, Rockingham Bay); Mem. Queensland Mus., vol. 5, 1916, p. 179 (Hervey Bay).

Holacanthus darwiniensis Kent, Proc. Roy. Soc. Queensland, vol. 6, 1890, p. 235. Darwin.

Purplish brown. Broad yellow band from below 3 front dorsal spines across opercle and pectoral base to ventral and belly. Second band from sixth dorsal spine to caudal peduncle, sometimes across latter. Dorsal and anal purple, with numerous pale blue waved and often interrupted horizontal lines. Caudal and paired fins yellow. Reaches 195 mm. (Ogilby.)

Queensland.

HOLACANTHUS CONSPICILLATUS Waite

Holacanthus conspicillatus Waite, Rec. Austral. Mus., vol. 3, 1897–1900 (June 15, 1900), p. 203, pl. 35. Lord Howe Island.

Chaetodontoplus conspicillatus Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 114 (Moreton Bay).

Holacanthus (*Chaetodontoplus*) *conspicillatus* McCulloch, Mem. Queensland Mus., vol. 7, pt. 4, 1922, p. 242 (Capricorn Group).

Holacanthus (*Chaetodontoplus*) *personifer* McCulloch, Rec. Austral. Mus., vol. 1, pt. 3, 1914, p. 221, pl. 31. West Australia; Biol. Res. Endeavour, vol. 4, pt. 1, 1916, p. 195, pl. 56, fig. 2 (Wide Bay, Queensland).

Body deep purple, abdomen smoky brown. Broad creamy band from nape to pectoral, sometimes narrowing below pectoral to point or may include whole breast. Snout and interorbital yellowish brown, rest of head smoke brown with small to large scattered yellow spots. Dorsal and anal like body, with narrow white border. Caudal and ventrals yellow. Pectorals purple, upper 2 rays and broad terminal border creamy. Length 178 mm. (Ogilby.)

Lord Howe Island, Queensland and West Australia.

HOLACANTHUS MELANOSOMA Bleeker

Holacanthus melanosoma Bleeker, Nat. Tijds. Ned. Indië, vol. 5, 1853, p. 78. Lawajong, Solor.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 55 (copied); Cruise of Curaçoa, Brenchley, 1873, p. 410 (Misol, Moluccas).

Chaetodontoplus melanosoma Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 57, pl. (9) 369. fig. 1 (not 3) (Solor example).

Depth 1⅞ to 2; head 3⅙ to 3⅖, width 1½ to 1⅘. Snout 2⅘ to 3⅛ in head from snout tip; eye 2¾ to 3⅖, 1½ in snout to little longer than snout in young, equals interorbital to little greater in young; maxillary 3¼ to 3¾ in head, reaches at least to front nostril; interorbital 3¼ to 3⅔, broadly convex; preopercle with upper edge 3⅔ to 4¼. Gill rakers 4 + 11, lanceolate, ⅓ of gill filaments, which 1½ in eye.

Scales 60 to 70 in median lateral series from gill opening to caudal base; 18 or 19 scales above lateral line, 48 to 50 below. Scales with 1 to 3 basal radiating striae; apical denticles 15 to 20, each with long slender rootlet; circuli very fine.

D. XIII, 17, I or 18, I, last spine 1⅗ to 1⅞ in total head length, fifth ray 1½ to 1⅔; A. III, 18, I, third spine 1⅓ to 1¾, seventh ray 1⅖ to 1½; least depth of caudal peduncle 2½ to 2⅗; caudal rounded convexly behind, 1⅖; pectoral 1⅖; ventral 1⅛ to 1¼.

Largely deep dusky brown. Occiput, front of head, muzzle above and interorbital with slightly paler ground color, marked with dark vermiculating lines. Iris dull yellowish. Dorsals and anals nearly blackish, except hind edges of soft fins which bordered whitish. Caudal white, with large median semicircular blackish blotch, its straight edge vertical and posterior. Paired fins blackish.

East Indies. Previously known only from Bleeker's type, which 120 mm. and Günther's record.

One example. Doc Can Island. January 7, 1910. Length 80 mm.
One example from stomach of *Variola louti* (A1527, length 450 mm.).
4349 [133] D. 5139. Jolo Island. February 14, 1908. Length 61 mm.
5147. Jolo market. March 6, 1908. Length 130 mm.

HOLACANTHUS DIMIDIATUS Bleeker

Holacanthus dimidiatus Bleeker, Act. Soc. Sci. Ind. Néerland. (Elfd. Viss. Amboina), vol. 8, 1860, p. 11. Amboina.

Chaetodontoplus dimidiatus Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 57, pl. (7) 369, fig. 4 (Amboina).

Very similar to *Holacanthus melanosoma* but differs slightly in color, the back lighter than the contrasted dark lower half of the body, also the caudal uniformly yellow. Reaches 166 mm. according to Bleeker, who mentions 5 examples.

Family ZANCLIDAE

Body deep, elevated, strongly compressed. Caudal peduncle unarmed. Mouth small. Teeth in jaws long, slender and brush-like; palate edentulous. Solid, thick bones on top of head form median frontal horn with age, not present in young. Preopercle unarmed, Branchiostegals 4. Pyloric coeca 14. Intestines long. Vertebrae 22, of which 13 caudal. Scales minute and rough. Dorsal single, spines 7, third and following prolonged as filaments; interspinal bone projects before dorsal. Anal like soft dorsal, long, front rays produced; small antrorse spine before anal. Caudal lunate. Pectoral short. Ventral pointed.

Genus ZANCLUS Cuvier

Zanclus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 102. Type *Chaetodon cornutus* Linnaeus, monotypic.

Gonopterus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 77. Type *Gonopterus morens* Gray, monotypic.

Gnathocentrum Guichenot, Ann. Soc. Maine et Loire, vol. 9, 1866, p. 4. Type *Gnathocentrum centrognathum* Guichenot, monotypic.

Body deeply ovoid. Head very deep. Snout and muzzle strongly produced. Teeth in jaws biserial. Opercle without spine. Air bladder large. Scales very small or indistinguishable. Head scaly above and laterally. Lateral line continuous to caudal base. Soft dorsal and anal anteriorly elevated. Paired fins subequal.

Indo-Pacific.

ZANCLUS CANESCENS (Linnaeus)

Chaetodon canescens Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 272. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 460.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1240 ("America").—Walbaum, Arted. Pisc., vol. 3, 1792, p. 443 (on Linnaeus).—Forster, Fauna Indica, 1795, p. 14.—Schneider, Syst. Ichth. Bloch, 1801, p. 219 (Indies).

Chetodon canescens Bonnaterre, Tabl. Ichth., 1788, p. 80, pl. 43, fig. 166 (East Indies).

Pomacanthus canescens Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 517, 519 ("South America").

Zanclus canescens Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 493 (copied).—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 78, pl. (4) 366, fig. 3 (Celebes, Amboina).—Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 549 (Misaki).—Franz, Abh. Bayer. Akad. Wiss., vol. 4. suppl., vol. 1, 1910, p. 50 (Aburatsubu).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 325 (Karkaralong Island and Rotti).—McCulloch, Mem. Queensland Mus., vol. 7, pt. 4, 1922, p. 242 (Capricorn Group).—Fowler, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam), p. 28 (Honolulu), p. 34 (Samoa).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Johnston Island, French Frigate Shoals, Laysan).—Fowler, Proc. Acad. Nat. Sci. Phila., 1927, p. 287 (Philippines).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 472, pl. 8 (Legaspi and Manila).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 782, pl. 31, fig. 3 (Mossel Bay, Natal, Delagoa Bay).

Chaetodon cornutus Linnaeus, Syst. Nat., ed. 10, vol 1, 1758, p. 273. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 461.—Bloch, Naturg. Ausl. Fische, vol. 3, 1787, p. 72, pl. 200, fig. 2 (East Indies).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1241 (India).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 442 (on Linnaeus and Bloch).—Forster, Fauna Indica, 1795, p.

14.—Schneider, Syst. Ichth. Bloch, 1801, p. 22 (Tranquebar).—Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 453, 471, pl. 11, fig. 1 (New France, East Indies, Indo-Pacific).

Chetodon cornutus Bonnaterre, Tabl. Ichth., 1788, p. 80, pl. 44, fig. 168 (Indies).

Zanclus cornutus Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 102, pl. 177 (Carolines, Hawaii, Tongatabu, Vanicolo, Celebes).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 26.—Playfair, Fishes of Zanzibar, 1866, p. 65 (Zanzibar).—Capello, Journ. Soc. Sci. Lisboa, 1871, p. 280 (Mozambique).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 438 (Mauritius).—Day, Fishes of India, pt. 1, 1875, p. 111, pl. 28, fig. 4.—Bleeker, Atlas Ichth. Ind. Néerland., vol. 9, 1877, p. 77, pl. (22) 366, figs. 1–2 (Sumatra, Batu, Cocos, Java, Celebes, Flores, Timor, Halmaheira, Ternate, Batjan, Ceram, Amboina, Haruco, Banda, Goram, Waigiu, New Guinea).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 251 (Manado, Celebes; Ternate; Rubi, New Guinea).—Day, Fauna Brit. India, vol. 2, 1889, p. 13, fig. 4.—Vinciguerra, Spall. Giorn. Roma Sci. Biol., ser. 2, vol. 19, 1890, p. 486 (Zanzibar).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 41.—Jatzow and Lentz, Abh. Senckenb. Naturf. Ges., vol. 21, Heft 1, 1897, p. 506 (Zanzibar).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 421 (Ternate, Batjan).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 269 (Cagayancillo, Fuga).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Amboina).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 325 (Karakaralang, Rotti).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 473, pls. 9–10 (Basco, Olongapo, Monja Island, Mariveles Bay, Calapan, Bulalacao Bay, Elefante, Simara, New Washington, Estancia, Tagapula, Carnasa, Clarendon Bay, Philippines).

Zanclus centrognathos Cuvier, Hist. Nat. Poiss., vol. 7, 1831, p. 528. Near equator, 75° E. (from stomach of albicore); Vanicolo (Quoy and Gaimard).

Chaetodon nudus Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 76. Indian Ocean.

Gonopterus moerens Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 77. India.

Zanclus montrouzieri (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 168. Woodlark Island.

Zanclus ruthiae Bryan, Occas. Papers Bishop Mus., vol. 2, No. 4, 1905 (1906), p. 22, fig. 2. Honolulu.

Depth 1 to 1⅕; head 2⅛ to 2⅓, width 2½ to 2¾. Snout 1⅓ to 1½ in head; eye 2⅞ to 5, 1⅞ to 3⅖ in snout, greater than interorbital in young to 1¼ in interorbital with age; maxillary 4 to 4½ in head; interorbital 3½ to 4⅛, broadly convex, with broad low antero supraorbital spine, scarcely evident in young. Gill rakers 1 + 10, short, clavate, 5 in gill filaments, which nearly equal eye.

Scales all rough, close set, imbricated narrowly.

D. VI to VIII, 39, i to 42, i, third spine long and filamentous or sometimes equals 1½ to 2 times total length of fish, usually shorter in adults; A. III, 34, i to 37, i, third spine 2⅗ to 3 in total head length, second ray 1⅓ to 1⅖; least depth of caudal peduncle 3 to 3¼; caudal emarginate, 1⅓ to 1½; pectoral 1⅖ to 1½; ventral 1 to 1⅗.

Generally white to yellowish-white. Broad black band includes predorsal and interorbital down with pectoral base, sides of breast to ventral bases. Within limits of same gray line from supraoccipital to upper front eye edge; one from predorsal to postocular with a third parallel down to opercle and both extended below, postocular to ventral origin and other to vent. Second broad blackish band from upper front part of soft dorsal vertically down across most of anal to front lobe of soft fin; submarginal posterior vertical line within black band over tail. Caudal largely blackish, hind edge whitish. Dark triangle over snout, angle directed down. Pectorals pale. Ventrals black. Iris dark.

Zanzibar, Mauritius, Reunion, India, East Indies, Philippines, Japan, Queensland, Melanesia, Micronesia, Polynesia, Hawaii. The form usually pale or but slightly contrasted in color, usually known as *Zanclus canescens,* we unite with the present species. The few examples we have seen are like Bleeker's and range from 65 to 70 mm. in length. They differ in no important way save for their paler or bleached coloration.

8121. Alimango Bay, Burias Island. March 5, 1909. Length 135 mm.
8935. Atulayan, Lagonoy Gulf. June 18, 1909. Length 155 mm.
4837. Biri Channel. June 1, 1909. Length 112 mm.
1054, 7469. Bolalo Bay. December 21, 1908. Length 74 to 153 mm.
8340. Buang Bay, Talajit Island. March 15, 1909. Length 164 mm.
998. Bubuan Island. February 14, 1908. Length 126 mm.
547, 548. Bugsuk. January 5, 1909. Length 122 to 137 mm.
5675. Busin Harbor, Burias Island. April 23, 1908. Length 150 mm.
9144, 1276. Cabugan Island, Hinunangan Island. July 30, 1909. Length 128 to 173 mm.
8379. Calangaman Island. March 16, 1909. Length 180 mm.
1250, 1251. Candaraman Island. January 4, 1909. Length 97 to 143 mm.
1209. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 120 mm.
505. Casogoran, Malhon Island. July 27, 1909. Length 85 mm.
7747, 7753. Caxisigan Island, Balabac. January 2, 1909. Length 170 mm.
7505. Endeavor Strait. December 22, 1908. Length 167 mm.
7557. Endeavor Strait. December 23, 1908. Length 167 mm.
18859. Inamucan Bay. August 8, 1909. Length 67 mm.
5970. Little Santa Cruz Island. May 26, 1908. Length 168 mm.
8845. Maculabo Island. June 14, 1909. Length 152 mm.
6591. Maricaban near Sepoc Point. July 21, 1908. Length 183 mm.
6253 to 6255, 6277. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 165 to 180 mm.
612. Murciclagos Bay. August 9, 1909. Length 82 mm.
20800. Nato River, Luzon, tidewater. June 18, 1909. Length 65 mm. Pale form.
6608, 10404. Northwest of Verde Island. July 22, 1908. Length 125 to 156 mm.
1269, 7982. Pagapas Bay. February 20, 1909. Length 128 to 157 mm.
7332. Pandan Island near Sablayan Bay, Mindoro. December 12, 1908. Length 151 mm.
5765, 5766. Port Capunuypugan, Mindanao. May 10, 1908. Length 140 to 155 mm.

18894. Port Maricaban. July 12, 1908. Length 135 mm.
4777. Port Maricaban. July 21, 1908. Length 150 mm.
5288 to 5289, 5590. Romblon Harbor. March 24, 1908. Length 120 to 145 mm.
584. Sablayan, Mindoro. December 13, 1908. Length 113 mm.
15709. Sanguisiapo Island. February 24, 1908. Length 66 mm.
A637. Simaluc Island. September 22, 1909. Length 179 mm.
7849. Taganac Island. January 7, 1909. Length 147 mm.
593, 594. Tara Island. December 15, 1908. Length 110 to 127 mm.
5831 to 5833. Tataibada Port. May 15, 1908. Length 125 to 145 mm.
10402, 10403. Tilig, Lubang Island. July 14, 1908. Length 132 to 153 mm.
8424. Tilig, Lubang Island. July 14, 1908. Length 140 mm.
4773. Tumindao Island. February 26, 1908. Length 74 mm.
7711. Ulugan Bay, Oyster Inlet. December 29, 1909. Length 165 mm.
6670. Varadero Bay, Mindoro. July 23, 1908. Length 151 mm.
6935, 6942 to 6945, 6972, 6973. West coast of Sablan Island. November 8, 1908. Length 152 to 189 mm.
21464. Danawan and Si Amil Islands. September 27, 1909. Length 78 mm.
433. Talisse Island. November 9, 1909. Length 92 mm.
22969, 22970. Limbe Strait, Celebes. November 9, 1909. Length 65 to 70 mm. Pale form.
657. Nan Wan, Formosa. January 25, 1910. Length 125 mm.
15415. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 115 mm.
8019. Reefs in Apra Bay, Guam. November 19–21, 1907. Length 95 mm.
30533 U.S.N.M. New Guinea. Australian Museum. Length 150 mm.
30608, 30611 U.S.N.M. New Guinea. Australian Museum. Length 100 to 157 mm. Two examples.
43900 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 90 to 165 mm. Fifteen examples.
47789 U.S.N.M. Port Jackson. Australian Museum. Length 160 mm.
47817 U.S.N.M. Port Jackson. Australian Museum. Length 162 mm.
51137 U.S.N.M. Hawaii. 1901. Length 117 mm.
52506 U.S.N.M. Samoa. Bureau of Fisheries. Length 83 to 155 mm. Four examples.
55006 U.S.N.M. Pauko Bay, Hawaii. *Albatross* collection. Length 140 mm.
55007, 55008 U.S.N.M. Hawaii. *Albatross* collection. Length 122 to 158 mm. Three examples.
55009 U.S.N.M. Honolulu. *Albatross* collection. Length 117 to 160 mm. Four examples.
55114 U.S.N.M. Laysan Island. April 2–3, 1902. Length 145 mm.
55380 U.S.N.M. Honolulu. *Albatross* collection. Length 125 mm.
56984 U.S.N.M. Pago Pago, Samoa. Bureau of Fisheries. Length 80 to 155 mm. Three examples.
66083 U.S.N.M. Jaluit, Marshalls. *Albatross* collection. Length 145 mm.
72213 U.S.N.M. Tuga Island, Philippines. R. C. McGregor. Length 72 mm.
75564 U.S.N.M. Honolulu. E. L. Berndt. Length 120 mm.
82817 U.S.N.M. Hawaiian Islands. Wilkes Exploring Expedition. Length 60 mm.
82945 U.S.N.M. Samoa. Wilkes Exploring Expedition. Length 125 mm.

Family HEPATIDAE

Body oblong, compressed, often elevated. Caudal peduncle armed with one or more spines or bony plates. Eye moderate, elevated. Mouth small or short, low. Premaxillary somewhat movable, not protractile. Jaws with uniserial incisorlike teeth, rarely setiform. Palate edentulous. Nostrils double, open close before eyes. Preocular groove present. Gill opening lateral. Gill rakers obsolete. Pseudobranchiae large. Air vessel large, bifurcated behind. Pyloric appendages rather few. Intestine long. Vertebrae 21 to 23 (=9 or 8+12 to 14). Scales very small, firmly attached. Lateral line continuous to caudal base. Dorsal single, with strong spines and soft fin usually larger than spinous. Anal like soft dorsal. Pectoral moderate. Ventrals present, usually with spine and 5 rays.

Herbivorous tropical fishes, many dark though often with some brilliance, others notable for their contrast or deep bodies. All are dangerous to handle, as by lashing the tail from side to side they are able to inflict severe or dangerous wounds on the incautious by means of the dreaded caudal spine. Fossils have been associated with these fishes as *Aulorhamphus* De Zigno and *Apostasis* Kramberger, both without caudal armature, the latter with a serrated opercle.

ANALYSIS OF THE GENERA

a^1. HEPATINAE. Tail armed with very sharp, antrorse, erectile, lancetlike spine, fitting in a groove.
  b^1. Teeth movable, rather long, bristlelike and expanded at tips; dorsal spines 8 or 9 ---------- **Ctenochaetus**
  b^2. Teeth immovable, lobate, broad, spines 6 to 10.
    c^1. Ventral with 3 soft rays ---------- **Paracanthurus**
    c^2. Ventral with 5 soft rays.
      d^1. Body oblong ovate to moderately ovate; dorsal spines 6 to 10; soft dorsal and anal not elevated in front; caudal usually lunate **Hepatus**
      d^2. Body deep, subrhomboid; dorsal spines 4 or 5; soft dorsal and anal high anteriorly; caudal truncate ---------- **Zebrasoma**
a^2. NASINAE. Tail armed with firmly immovable bony bucklers, each keeled or with rigid spine.
      e^1. Caudal bucklers 2 ---------- **Naso**
      e^2. Caudal bucklers more than 2 ---------- **Prionurus**

Genus CTENOCHAETUS Gill

Ctenochaetus GILL, Proc. U. S. Nat. Mus., vol. 7, 1884 (1885), p. 279. Type *Acanthurus strigosus* BENNETT, orthotypic.

Teeth long, slender, movable, bristlelike, with expanded tips strongly serrulated. Dorsal spines 8 or 9. Coloration dark or sombre.

CTENOCHAETUS STRIGOSUS (Bennett)

Acanthurus strigosus BENNETT, Zool. Journ., vol. 4, 1828, p. 41. Hawaiian Islands.—VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 243 (New Guinea).—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 264 (Cauer); vol. 6, 1854, p. 313 (Larantuka, Flores Island); vol. 8, 1855, p. 296 (Ternate), p. 306 (Batoe Island); vol. 9, 1855, p. 106 (Sabu, Halmaheira), p. 234 (Manado, Celebes); vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 81 (Malong, Java), p. 95 (Banda); vol. 12, 1856, p. 230 (Batu), p. 293 (Boleling, Bali); vol. 13, 1857, p. 372 (Sangi), p. 478 (Karangbollong);

vol. 15, 1858, p. 159 (Prigi), p. 200 (Goram); vol. 17, 1858–59, p. 130 (Atapoepoe, Timor); vol. 22, 1860, p. 113 (Buru); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Tanawanko); vol. 3, No. 9, 1857–58, p. 5 (Priaman).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 324 (type).—PETERS, Monatsber. Akad. Wiss. Berlin, 1876, p. 440 (Mauritius).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 116, pl. 79, figs B–C (Red Sea, East Africa, Hawaii, Polynesia).—DAY, Fishes of India, pt. 2, 1876, p. 207, pl. 47, fig. 2 (Andamans).—BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 2 (Mauritius).—GÜNTHER, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—DAY, Fishes of India, Suppl., 1888, p. 789 (note); Fauna Brit. India, vol. 2, 1889, p. 143.—STEINDACHNER, Denkschr. Akad. Wiss. Wien, Math. Naturw. Kl., vol. 71, abth. 1, 1907, p. 140 (Bal Haf, South Arabia).—REGAN, Ann. Durban Mus., 1908, p. 246 (Kosi Bay).—PEARSON, Ceylon Administ. Rep. Marine Biol., 1912–13, p. E6.—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 319 (Nusa Laut, Tuir, Kur).

Acanthurus (*Ctenodon*) *strigosus* KLUNZINGER, Fische Roth. Meer., 1884, p. 85.—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 427 (Batjan, Ternate).

Ctenochaetus strigosus FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Laysan, French Frigate Shoals, Johnston Island, Wake Island).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 8 (Poeloe Toekus Island, Sumatra).—HERRE, Philippine Journ., Sci., vol. 34, No. 4, Dec. 1927, p. 438, pl. 15. figs. 2–3 (Manila, Nasugbu, Calapan, Puerto Galera, Sibubu Point, Sialat, Canigaran, Tubigan, Sibutu, Sitanki, Guam).

Acanthurus striatus (not QUOY and GAIMARD) VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 229 (part) (Hawaiian Islands).

Ctenochaetus striatus EVERMANN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 97 (Zamboanga).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 423 (Misaki).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 57 (Zamboanga).—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 437, pl. 13, fig. 2 (Guam and Mangarin).

Ctenochaetes striatus FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar)

Teuthis striatus BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 780 (Zululand).

Acanthurus ctenodon VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 241, pl. 289. Caroline Islands, New Guinea.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 342 (Ceylon, Amboina, Ceram, New Hebrides).—BLEEKER, Verslagen Mededeel. Kon. Akad. Wet. Amsterdam, vol. 15, 1863, p. 21 (Hitu, Amboina); vol. 2, 1868, p. 284 (Solor); vol. 7, pt. 2, 1873, p. 36 (Aru Islands); Ned. Tijds. Dierk., vol. 1, 1863, p. 254 (Wahai, Ceram), p. 271 (Atapupu, Timor).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 57 (Zanzibar).—GUICHENOT, Mém. Soc. Sci. Nat. Cherbourg, vol. 2, pt. 2, 1866, p. 146 (Madagascar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 509 (Koseir, Red Sea).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (Manado, Celebes).

Ctenodon ctenodon FOWLER, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 545 (Padang).

Depth 1¾ to 2; head 2⅞ to 3½, width 1⅞ to 2. Snout 1⅓ to 1⅗; eye 3 to 4⅖, 1¾ to 3⅛ in snout, little greater than interorbital in young to 1⅕ in adult; teeth 44 to 48 rows in jaws; maxillary 3⅛ to 3¼ in head; interorbital 2⅞ to 3, convexly elevated; opercle and humeral arch with rather fine striae. Gill rakers 9 + 16, short, slenders points, often clavate.

Scales discoid, narrowly imbricate, circuli very minute; apical denticles 44 to 48, with 5 to 13 transverse series usually developed as distinct cusps.

D. IX, rarely VIII, 27, I or 28, I, last spine 1⅞ to 2 in head, sixteenth ray 1⅙ to 1⅓; A. III, 21, I to 25, I, third spine 2⅛ to 2⅖, nineteenth ray 1⅓ to 1⅖; caudal deeply emarginate to lunate, lobe sharply pointed though only moderately extended, 3 to 3¾ in combined head and body; least depth of caudal peduncle 2⅕ to 2⅘ in head; pectoral 2⅗ to 3⅛ in combined head and body; ventral 1⅛ to 1¼ in head; caudal spine 3¼ to 4¾.

Pale reddish to chocolate brown, with numerous longitudinal waved or regular narrow lines on trunk and tail. Numerous small pale or whitish spots on head and breast often present. Sometimes several blue lines on dorsal and anal.

Red Sea, Zanzibar, Natal, Madagascar, Mauritius, Rodriguez, Ceylon, Andamans, East Indies, Philippines, Formosa, Japan, Melanesia, Micronesia, Polynesia, Hawaii. A very abundant species in the coral reefs. Herre contends *Ctenochaetus striatus* (Quoy and Gaimard) is distinct, with lower body or depth 2⅕ to 2⅖, and 9 to 11 longitudinal bluish white stripes and no spots on the side of the head.

8151, 8959, 8961, 15156. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 177 to 240 mm. Five examples.

15689, 15690, 17760. Alimango Bay, Burias Island. March 5, 1909. Length 168 to 195 mm. Five examples.

10346. Atulayan Island. June 18, 1909. Length 113 mm.

7731. Baganga Bay. May 13, 1908. Length 210 mm.

8963. Between Paron Point and Jesus Point, Gulf of Luzon. June 21, 1909. Length 218 mm.

9488. Bolalo Bay, Palawan Island. December 21, 1908. Length 200 mm.

8341, 8346, 15628. Buang Bay, Talajit Island. March 15, 1909. Length 185 to 275 mm. Orange spots covering front of head, side under eye, running backward into nuchal region somewhat. Dorsal and anal with orange stripes or bars, body stripes as usual.

4626. Bubuan Island. February 14, 1909. Length 185 mm.

12205. Bugsuk Island, Balabac. January 5, 1909. Length 225 mm.

5625. Busin Harbor, Burias Island. April 22, 1908. Length 245 mm.

17699. Busin Harbor. March 8, 1909. Length 152 mm.

9343, 9346. Cagayan, Sulu Island. January 8, 1909. Length 146 to 200 mm.

7849, 7861, 9444, 9445, 9447, 12928. Candaraman Island, Balabac. January 4, 1909. Length 140 to 193 mm.

8028. Capulaan Bay, Luzon. February 24, 1909. Length 225 mm.

11853. Caracaran, Batan Island. June 8, 1909. Length 133 mm.

11793. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 195 mm.

12255, 12570. Caxisigan Island. January 2, 1909. Length 158 to 219 mm.

7672, 5711. Cebu market. April 4, 1908. Length 165 to 200 mm.

15845. Dupon Port, Leyte Island. March 17, 1909. Length 180 mm.
221. Endeavor Strait. December 24, 1908. Length 163 mm.
15737. Endeavor Strait. December 23, 1908. Length 140 mm.
18281. Galera Bay, Mindoro. June 9, 1908. Length 193 mm.
4589, 4590, 4592, 4593. Grande Island reef, Subig Bay. January 8, 1908. Length 137 to 195 mm.
9015 to 9021. Langao Point, Luzon. June 24, 1909. Length 225 to 230 mm.
4676. Limbones Cove. January 14, 1908. Length 195 mm.
5139, 5140, 6657, 6846, 18531 to 18533, 21039, 21040, 22231, 22232. Little Santa Cruz Island. May 26-28, 1908. Length 112 to 219 mm.
19151 [1341]. Lode Bay, Destacado Island. March 13, 1909. Length 195 mm
8816. Maculabo Island. June 13, 1909. Length 263 mm.
8828 [940]. Malcochin River, Pagapas Bay, Luzon. February 20, 1909. Length 226 mm.
8883, 14929. Mansalay, Mindoro. June 4, 1908. Length 187 to 210 mm.
15064, 15065. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 140 to 148 mm.
10346. Maricaban Island. July 21, 1908. Length 118 mm.
11374. Maricaban Island. June 20, 1908. Length 130 mm.
5572, 9051. Masbate Reef, Masbate. April 20, 1908. Length 182 to 238 mm.
15103. Murcielagos, Mindanao. March 3, 1909. Length 200 mm.
8828. Murcielagos. August 20, 1909. Length 230 mm.
18545. Observatory Island. December 19, 1908. Length 175 mm.
22798. Opol, Mindanao Island. August 4, 1909. Length 120 mm.
7942, 7943, 15860. Pagapas Bay, Luzon. February 20, 1909. Length 166 to 235 mm. Fine stripes of light bluish on shoulder at and below pectoral base and body posteriorly greenish. On dorsal 5 or 6 densely greenish stripes, similarly on anal. First pectoral ray very dark, center of fin yellow. Ventrals like body. Some examples with fine lines on body very deep violet.
11304. Palag Bay vicinity, Luzon. June 16, 1909. Length 143 mm.
19062, 19064. Paluan Bay, Mindoro. December 11, 1908. Length 39 to 195 mm.
9045. Panabutan Bay, Mindanao. February 6, 1908. Length 192 mm.
4646. Port Binanga, Subig Bay. January 9, 1908. Length 145 mm.
14715. Port Caltom. December 15, 1908. Length 200 mm.
6940, 14532, 14533. Port Galera, Mindoro. June 9, 1908. Length 143 to 205 mm.
9180, 16615, 17734. Port Jamelo, Luzon. July 13, 1908. Length 168 to 198 mm.
10723, 21144. Port Maricaban. July 21, 1908. Length 113 to 235 mm.
17537, 17538. Port Matalvi. November 23, 1908. Length 150 to 165 mm.
14595. Port Palapag. June 3, 1909. Length 30 mm.
220, 9243, 12589, 12590, 15645. Rapurapu Island. June 22, 1909. Length 95 to 215 mm.
13366, 13368, 14782, 14783. Sablayan, Mindoro Island. December 12, 1908· Length 128 to 153 mm.
15638. Sablayan. December 13, 1908. Length 153 mm.
16973. Sabtan Island. November 8, 1908. Length 205 mm.
14682. Langao Point, Luzon. June 24, 1909. Length 175 mm.
12230. Santa Cruz Island, Marinduque. April 24, 1908. Length 173 mm.
10367. Tilig, Lubang Island. July 14, 1908. Length 192 mm.
22186. Simaluc Sibi Sibi Island. September 23, 1909. Length 55 mm.
12701. Tara Island. December 14, 1908. Length 160 mm.
10367, 18876, 19144. Tilig, Lubang. July 14-15, 1908. Length 150 to 190 mm.
15604. Tulayan Island. September 15, 1909. Length 182 mm.
7931 to 7933. Tutu Bay, Jolo Island. September 19, 1909. Length 138 to 188 mm.

7656. Ulugan Bay, Oyster Inlet. December 28, 1908. Length 235 mm.

10409, 11032, 17718. Varadero Bay, Mindoro. July 23, 1908. Length 153 to 230 mm.

7121, 7134 to 7136, 7341, 16465. West coast of Palaui Island. November 18, 1908. Length 128 to 230 mm.

6927, 6967, 6983, 6984. West coast of Sabtan Island. November 8–9, 1908. Length 163 to 200 mm. Body almost uniformly striped, with umber and indigo later fading to yellowish; stripes continued on dorsal base, but replaced on terminal portions of fins by slightly broader but similar bars. Numerous umber and bronzy spots about eye. Lower head and breast plain. Anal barred like dorsal. Caudal uniform. Pectoral rays dusky yellow, membranes hyaline. Ventral uniform.

13454, 14321, 14322. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 114 to 155 mm.

12926, 12929, 13416, 22229. Buka Buka Island, Celebes. November 20, 1909. Length 110 to 153 mm. [2058]. Brownish, dark in life, spotting of side of head indistinct, lower part slightly paler. Dorsal olive, with 5 or 6 bars, beginning as darker olive and on soft fin become cadmium or orange, fuse on fin posteriorly and terminally to form entire color; extreme fin edged narrowly black above; black blotch at axil. Anal like dorsal. Caudal fades whitish. Ventral blackish terminally, membranes hyaline and scattered small, orange, basal spots, rays probably black in life.

21118. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 130 mm.

20671. Sadaa Island, Celebes. November 17, 1909. Length 143 mm.

13634. Una Una Road, Binang Unang Island, Celebes. November 18, 1909. Length 70 mm.

Nine examples. Tomahu Island, tide pools. December 11, 1909. Length 43 to 63 mm.

13059. Gomomo Island. December 3, 1909. Length 135 mm.

A1581, A1582. Soo Wan, eastern Formosa. January 29, 1910. Length 228 to 233 mm.

12035 to 12039. Apra Bay Reefs, Guam. November 19 to 21, 1907. Length 145 to 185 mm.

7932. (Philippines.) No label. Length 195 mm.

5750 U.S.N.M. Tahiti. William Stimpson. Length 225 mm.

30553, 30633 U.S.N.M. New Guinea. Australian Museum. Length 167 to 183 mm.

30569, 30644 U.S.N.M. New Guinea. Australian Museum. Length 152 to 172 mm. Two examples.

42347 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 73 to 205 mm. Twelve examples.

51087 U.S.N.M. Hawaii. Bureau of Fisheries. Length 170 mm.

55104 U.S.N.M. Honolulu. *Albatross* collection. Length 40 to 155 mm. Seven examples.

55331 U.S.N.M. Honolulu reef. *Albatross* collection. Length 108 mm.

55344 U.S.N.M. Honolulu. November 1896. Length 138 to 157 mm. Five examples.

55536 U.S.N.M. Kailua, Hawaii. *Albatross* collection. Length 110 to 150 mm. Seven examples.

55924 U.S.N.M. Zamboanga, Philippines. Bureau of Fisheries. Length 218 mm. [4120].

65468 U.S.N.M. Mangareva. *Albatross* collection. Length 80 to 106 mm. Ten examples.

65807 U.S.N.M. Papeete, Tahiti. *Albatross* collection [05925]. Length 55 to 57 mm. Two examples.

84223, 84255 U.S.N.M. Zamboanga, Philippines. Dr. F. Baker. Length 125 to 155 mm.

Genus PARACANTHURUS Bleeker

Paracanthurus BLEEKER, Ned. Tijds. Dierk., vol. 1, 1863, p. 254. Type *Teuthis hepatus* (not LINNAEUS) SCHNEIDER=*Colocopus lambdurus* GILL, monotypic.

Colocopus GILL, Proc. U. S. Nat. Mus., vol. 7, 1884 (1885) p. 279. Type *Colocopus lambdurus* GILL, orthotypic.

Greatly like the typical species of *Hepatus* but with only 2 or 3 branched ventral rays.

This genus was first named by Bleeker, though apparently without diagnosis, a fact overlooked or ignored by Gill when he later proposed *Colocopus*.

PARACANTHURUS THEUTHIS (Lacépède)

Acanthurus theuthis LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 547, 549. Amboina (on LINNAEUS; not Carolina=*Teuthis hepatus* LINNAEUS).

Acanthurus teuthis SHAW, Gen. Zool., vol. 4, 1803, p. 377 (Indian [not American] Seas).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 318 (Banda).

Teuthis hepatus (part) LINNAEUS, Syst. Nat., ed. 12, vol. 1, 1766, p. 507 (Amboina).—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1362.—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 622.—FORSTER, Fauna Indica, 1795, p. 16.

Acanthurus hepatus SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 211 (Japan [not Bahamas]).—VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 183, pl. 288 (Mauritius; New Guinea).—BLEEKER, Nat. Tijds. Nederland. Indie, vol. 6, 1854, p. (313) 325 (Larantuka, Floris Island); vol. 20, 1859-60, p. 198 (Priaman); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 8 (Macassar); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 8 (Sumatra), 1859, p. 14 (Priaman).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3 1861, p. 341 (Amboina); Journ. Mus. Godeffroy, vol. 4, 1875, p. 115, pl. 75 (Kingsmills).—PETERS, Monatsber. Akad. Wiss. Berlin, 1876, p. 439 (Mauritius).—DAY, Fishes of India, pt. 2, 1876, p. 206.—GÜNTHER, Rep. Voy. Challenger, vol. 1, pt. 6, 1880, p. 52 (Zamboanga).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (Manado, Celebes).—DAY, Fauna Brit. India, vol. 2, 1889, p. 143.—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 34 (Mauritius).

Colocopus lambdurus GILL, Proc. U. S. Nat. Mus., vol. 7, 1884 (1885), p. 279 (on GÜNTHER 1875).

Paracanthurus lambdurus HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 435, pl. 13, fig. 3 (Elefante, Simara, Tablas, Jolo).

Depth 1¾ to 2⅛; head 3¼ to 3⅘, width 2 to 2¼. Snout 1⅖ to 1¾; eye 2⅘ to 4⅗, 1¾ to 3¼ in snout, 1 to 1⅓ in interorbital; teeth 12 to 14 in each jaw; maxillary 4 to 4⅙ in head; interorbital 3 to 3⅖, convex. Gill rakers 3+7, short, firm, broad points.

Scales very finely scabrous, compact, enlarged about preorbital and around and before caudal spine.

D. IX, 19 or 20, ninth spine $1\frac{3}{4}$ to $2\frac{1}{5}$ in head, first ray $1\frac{4}{5}$ to $2\frac{1}{10}$; A. III, 19, third spine $2\frac{1}{5}$ to $2\frac{1}{4}$, first ray $1\frac{4}{5}$ to $2\frac{1}{10}$; caudal slightly emarginate behind, points little exserted, truncate in young, $1\frac{1}{5}$ to $1\frac{1}{4}$; least depth of caudal peduncle $2\frac{7}{8}$ to 3; pectoral $1\frac{1}{8}$; ventral $1\frac{7}{8}$ to 2, spines robust; caudal spine $3\frac{1}{5}$ to 4.

Gray brown generally, variably more bluish gray in some examples, especially about head and costal region. Broad, blackish-brown band strongly contrasted, like all rest of similar dark color of back; band extends up above suprascapular region or along upper edge of back, gradually broadening until reaching front of caudal peduncle; a forward extension continued along median axis of tail from caudal spine till nearly above pectoral base; with age this band slopes up to dark dorsal band with which it unites just behind suprascapular region; posteriorly dark area of back extends above and below as strongly contrasted border both along caudal peduncle and caudal fin, pale intervening cuneate area resulting yellowish buff. Iris dusky. Bases of dorsals and anals broadly grayish or light bluish with tinge of light brown, margins of fins broadly blackish. Pectoral grayish or blue-gray over greater basal half or more, dusky above, and hind margin broadly pale yellowish buff; young with uniform pale pectoral. Ventral pale hind edge little brownish.

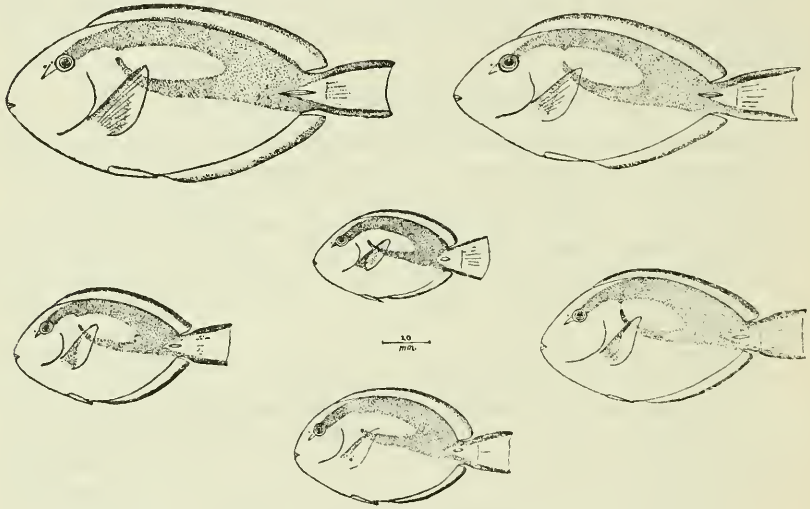

FIG. 10.—VARIATION OF COLOR MARKINGS OF PARACANTHURUS THEUTHIS (LACÉPÈDE)

Mauritius to the East Indies, Philippines, Melanesia.

14269, 14620. Doc Can Island. January 7, 1910. Length 74 to 153 mm.
A1640. Philippines. Length 217 mm.

6576, 6577. Port Maricaban. July 21, 1908. Length 248 to 262 mm.
5038 to 5046. Silino Island. August 10, 1909. Length 109 to 200 mm.
A677. Sitanki Reef. September 24, 1909. Length 200 mm.
11506, 11508, 11509, 21739. Sulade Island. September 17, 1909. Length 65 to 92 mm.
A1235. Gomomo Island. December 3, 1909. Length 205 mm.
21359, 21360. Limbe Strait, Celebes. November 11, 1909. Length 140 to 153 mm.
A1050. Tidore Island, south of Ternate. November 24, 1909. Length 255 mm.

Genus HEPATUS Gronow

Hepatus GRONOW, Zoophylac., 1763, p. 113. Not binominal. Type *Teuthis hepatus* LINNAEUS, tautotypic.

Teuthis LINNAEUS, Syst. Nat., ed. 12, vol. 1, 1766, p. 507. Type *Teuthis hepatus* LINNAEUS=*Chaetodon caeruleus* BLOCH, designated by GILL, Proc. U. S. Nat. Mus., 1884, p. 278.

Theutis BONNATERRE, Tabl. Ichth., 1788, p. LV (156). Type *Teuthis hepatus* LINNAEUS.

Rhombotides KLEIN, Neuer Schauplatz, vol. 1, 1775, p. 922. Type *Chaetodon caeruleus* BLOCH, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 38 (inadmissible).

Theutys GOUAN, Hist. Pisc., 1770, p. 105. Atypic. Type *Teuthis hepatus* LINNAEUS.

Acanthurus FORSKÅL, Descr. Animal., 1775, p. 59. Type *Teuthis hepatus* LINNEAUS, designated by DESMAREST, Encycl. Hist. Nat. Rept. Poiss. Chenu, 1874, p. 240.

Harpurus FORSTER, Enchir. Hist. Nat., 1788, p. 84. Atypic. Type *Chaetodon sohal* FORSKÅL, designated by FOWLER, Journ. Acad. Nat. Sci. Philadelpia, vol. 12, ser. 2, 1904, p. 544.

Aspisurus LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, p. 556. Type *Aspisurus sohar* LACÉPÈDE, monotypic.

Ctenodon (not WAGLER 1830 or EHRENBERG 1838) SWAINSON, Nat. Hist. Ann., vol. 2, 1839, p. 255. Type *Ctenodon ruppellii* (not *Acanthurus ruppellii* BENNETT) SWAINSON=*Chaetodon sohal* FORSKÅL, designated by SWAIN Proc. Acad. Nat. Sci. Philadelphia, 1882, p. 276.

Acronurus (GRONOW) GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 345. Type *Acanthurus argenteus* QUOY and GAIMARD, designated by JORDAN, Genera of Fishes, pt. 3, 1919, p. 307.

Body oblong, ovate to moderately ovate, never greatly elevated. Teeth fixed, strong, lobate, edges finely serrated. Dorsal spines usually 9, variably 6 to 10. Soft dorsal and anal not elevated anteriorly. Caudal spine erectile from a groove, antrorse, very sharp and lancet-like. Caudal variously emarginate to lunate. Ventral with spine and 5 rays.

Numerous species, with generally sombre colors though a few most strikingly banded, spotted or otherwise contrasted with brilliant tints. Most are abundant in coral reefs. With age the dangerous caudal spine is developed, usually absent in the young.

ANALYSIS OF THE SPECIES

I. HEPATUS. Dorsal spines 8 to 10; dorsal and anal rays subequal; scales variably moderate or small.
a^1. Body without any cross bands.
b^1. No white ring around mouth or around lower jaw.
c^1. No black or yellow shoulder blotch.
d^1. Coloration nearly uniform, without conspicuous markings.
e^1. Caudal variable, but not entirely pale yellow and greatly contrasted with rest of dark coloration.
f^1. Ground color brown, sometimes whitish band transversely across caudal base.
g^1. Not uniform yellow.
h^1. No pale or white transverse band from front of spinous dorsal down to opercle.
i^1. Caudal with transverse, white, broad, basal band, disappearing with age; dorsal and anal with dark blue longitudinal streaks; pectoral uniformly dusky---------- **fuliginosus**
i^2. Caudal with brown transverse basal band---------- **mindorensis**
i^3. Caudal without white basal band.
j^1. Posterior half of pectoral yellow---------- **doreensis**
j^2. Pectoral uniformly dusky.
k^1. No black spot in pectoral axil or at base of last dorsal or anal ray---------- **mata**
k^2. Black blotch in pectoral axil showing below base of fin---------- **thompsoni**
k^3. Black spot at base of last dorsal ray and another at base of last anal ray---------- **elongatus**
h^2. Whitish band from front of spinous dorsal down to postocular and opercle region, sometimes pale---- **leucopareius**
g^2. Uniform yellow---------- **chrysosoma**
f^2. Reddish brown with scattered blue dots on head and trunk; vertical fins blackish-brown, dorsal and anal with blue edges---------- **marginatus**
e^2. Caudal pale yellow and greatly contrasted with rest of uniform dark coloration---------- **philippinus**
d^2. Body with bluish longitudinal bands or lines or with dots disposed in longitudinal series.
l^1. Soft dorsal rays 30 to 32, anal 28 to 30---------- **sohal**
l^2. Soft dorsal rays less than 30, anal usually less than 28.
m^1. No black spot at base of last dorsal or anal ray.
n^1. Greenish brown, with 8 longitudinal yellowish waved lines on body, 3 on dorsals and anals and 3 transversely on caudal; head and breast spotted with yellowish---------- **flavoguttatus**

n^2. Brown with 11 or 12 straight longitudinal bluish streaks---------------**lineatus**

n^3. Brown with 12 or 13 undulated whitish lines, ascending posteriorly---------------**undulatus**

n^4. Brown, with 20 or more blue longitudinal lines, about 10 across head; soft dorsal and anal with 6 or 7 dark longitudinal lines and pale blue basal line---------------**bleekeri**

n^5. Dark brown with very many fine rather regular bluish longitudinal lines---------------**bariene**

m^2. Black spot at base of last dorsal and anal rays; very numerous or fine longitudinal blue lines.

o^1. White band transversely at caudal base; anal line along and within margin; posterior half of pectoral yellowish---------------**grammoptilus**

o^2. Caudal without white basal band; anal uniformly dark; pectoral uniformly dusky---------------**lineolatus**

c^2. Black or yellow blotch at shoulder or superiorly on gill opening.

p^1. Shoulder blotch yellow or orange.

q^1. Oblong, black-edged, orange shoulder blotch extends beyond pectoral fin; hind caudal edge white (in young transverse white basal band)---------------**olivaceus**

q^2. Oblong vertical or circular yellow spot, edged black; hind caudal edge broadly white---**pyroferus**

q^3. Suprascapular region orange, with black streak from opercle till above middle of pectoral; another black band from caudal spine to above middle of anal; caudal with broad white transverse band---------------**nigricans**

p^2. Shoulder blotch black, rather small, present at least with age; variable transverse whitish caudal band present; head, predorsal and breast dotted or spotted with whitish.

r^1. Pectoral uniform dark brown; edges of soft dorsal and anal narrowly bluish, fins otherwise without dark bands; body without blue longitudinal lines---------------**nigrofuscus**

r^2. Pectoral dusky, terminally third pale yellowish; dorsal and anal with 6 to 9 dark longitudinal bands; body with numerous blue, waved, longitudinal lines---------------**maculiceps**

b^2. Whitish ring around mouth or around lower jaw.

s^1. Tail without large, naked, rhombic red area before and including caudal spine.

t^1. No white crescent below eye; fins uniformly dark or like body.

u^1. Opercular edge white---------------**aterrimus**

u^2. Opercular edge black---------------**leucosternon**

t^2. Broad white crescent below eye; white line along dorsal and anal bases, widening posteriorly---------------**glaucopareius**

s^2. Tail with large, naked, rhombic, red area before and including caudal spine-------**achilles**

a^2. Body with pale or dark cross bands.

v^1. Seven white transverse cross bands and usually another across tail; tail and soft vertical fins with pale spots------------------**guttatus**

v^2. Five black transverse bands, first passing through orbit------------------**triostegus**

II. Harpurina, new subgenus. Type *Hepatus nubilus*, new species. Dorsal spines 6 or 7; last dorsal and anal rays longest; scales rather large------------------**nubilus**

HEPATUS FULIGINOSUS (Lesson)

Acanthurus fuliginosus Lesson, Voy. Coquille, Zool., vol. 2, pt. 1, 1830, p. 149, pl. 27, fig. 2. Oualan; Offack Bay, Waigiu.

Hepatus fuliginosus Fowler, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Wake Island).

Chaetodon nigricans (not Linnaeus) Bloch, Naturg. Ausl. Fische, vol. 3, 1787 [p. 82], pl. 203 (verschiedenen weltgegenden).

Acanthurus matoides Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 204. Oualan.—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 161 (Timor Kupang), p. 740 (Macassar); vol. 4, 1853, p. 93 (Amboina); vol. 5, 1853, pp. 319, 320 (Amboina); vol. 6, 1854, p. 204 (Timor Kupang), p. 457 (Amboina), p. 517 (Oelakan), p. 518 (Cocos Island); vol. 7, 1854, p. 38 (Cocos Island), p. 227 (Macassar), p. 228 (Manado, Celebes), p. 361 (Batjan); vol. 8, 1855, p. 296 (Ternate), p. 393 (Amboina), p. 463 (Manado); vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 81 (Malang, Java), p. 95 (Banda), p. 385 (Kajeli, Buru), p. 489 (Ceram); vol. 12, 1856, p. 193 (Ternate), p. 293 (Boleling, Bali); vol. 13, 1857, p. 372 (Sangi Islands), p. 384 (Batjan), p. 388 (Timor deli), p. 478 (Karangbollang), p. 479 (Prigi, Java); vol. 14, 1857, p. 245 (Prigi); vol. 15, 1858, p. 200 (Goram); vol. 16, 1858, p. 209 (Batjan); vol. 17, 1858–59, p. 143 (Boleling, Bali); vol. 18, 1859, p. 354 (Bavean); vol. 19, 1859, p. 331 (Patjitan, Java), p. 333 (Karangbollong); vol. 20, 1859–60, p. 203 (Karangbollong), p. 206 (Boleling, Bali); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado), p. 89 (Macassar); vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Manado, Tamawanko); vol. 5, No. 8, 1858–59, p. 2 (Tobariri, Celebes); vol. 8, (Sumatra), 1859, p. 12 (Benculen).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 330 (Amboina, Pinang, Fiji).—Day, Fishes of Malabar, 1865, p. 126.—Kner, Reise Novara, Fische, 1865, p. 210 (Pujnipet, Madras).—Playfair, Fishes of Zanzibar, 1866, p. 56 (Aden, Zanzibar); Proc. Zool. Soc. London, 1867, p. 858, fig. (head of old example).—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 439 (Mauritius).—Day, Fishes of India, pt. 2, 1876, p. 205 (Madras).—Günther, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—Steindachner and Döderlein, Denks. Akad. Wiss. Wien, Math.-Natur. W. Kl., vol. 48, abth. 1, 1884, p. 37 (Oshima).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (North Celebes, Macassar; Tabukan, Sangi; Cebu).—Day, Fauna Brit. India, vol. 2, 1889, p. 141.—Pfeffer, Jahrb. Hamburg. Wiss. Anstalt., vol. 6, 1889, p. 22 (Zanzibar).—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 340 (type).—Elera, Cat. Fauna Filipin., pt. 1, 1895, p. 532 (Cebu).—Gilchrist and Thompson, Ann. South Afric. Museum, vol. 6, pt. 2, 1908, p. 185 (Natal).—Franz, Abh. Bayer. Akad. Wiss., vol. 4, suppl., vol. 1, 1910, p. 50 (Aburatsubu).—Pearson, Ceylon Administ. Rep. Marine Biol., 1912–13, p. E42.—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 430, pl. 16, fig. 3 (Mission, Paraoir, Hundred Islands, Subic Bay, Manila, San Miguel Bay, Calapan, Bantayan, Guimaras, Zamboanga, Tubigan, Pearl Bank, Sibutu, Sitanki, Sandakan; Honolulu).

Rhombotides matoides Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 270 (Atapupu, Timor); Verslagen Mededeel. Akad. Wet. Amsterdam, ser. 2, vol. 7, 1868, p. 302 (Sangir); Verh. Kon. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 2 (Mauritius).

Hepatus matoides JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Iloilo).—JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Calayan, Aparri).—SEALE, Philippine Journ. Sci., vol. 5, pt. 4, 1910, p. 283 (Sandakan, North Borneo).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 57 (Cebu).

Acanthurus blochii (not BENNETT 1835) VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 209. Mauritius and Seychelles (on BLOCH, pl. 203).—GUICHENOT, Mém. Soc. Sci. Nat. Cherbourg, vol. 2, ser. 2, 1866, p. 146 (Madagascar).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 109, pl. 69, fig. B (Red Sea, East Africa, India, North Australia, Carolines, Society Islands, Samoa, Pelew Islands, Kingsmills).—BEAUFORT, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Amboina).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 316 (Celebes, Siau, Rotti).

Acanthurus annularis VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 209. Mauritius.—GUICHENOT, Notes I. Réunion, vol. 2, 1862, p. 27.—CASTELNAU, Res. F. Austral. (Victoria Rec. Philadelphia Expos.), 1875, p. 29 (Cape York).

Acanthurus xanthopterus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 215. Seychelles; Règne Animal, Ill., Poiss., 1839, pl. 71, fig. 2.—CANTOR, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1191, pl. 4 (Pinang).

Acanthurus melanurus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 240. Pondichery.—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. (237) 271 (Wahai, Ceram); vol. 4, 1853, p. 93 (Amboina); vol. 6, 1854, p. 90 (Banda Neira), p. 204 (Timor Kupang), p. 457 (Amboina); vol. 8, 1855, p. 306 (Batoe Island), p. 393 (Amboina), p. 436 (Manado, Celebes); vol. 11, 1859, p. 95 (Banda); vol. 13, 1857, p. 478 (Karangbollang, Java); vol. 17, 1858–59, p. 143 (Boleling, Bali); vol. 19, 1859, p. 331 (Patjitan, Java); Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48.

Acronurus melanurus GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 346 (Borneo; larval).—DAY, Fishes of Malabar, 1865, p. 127.

Acanthurus melas VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 241. Ceylon.—BLEEKER, Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48.

Acanthurus bipunctatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 331. China, Fiji.—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 532 (Luzon, Cavite).

Teuthis bipunctatus JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 358. Kotosho.—JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 554 (Formosa, Miyakoshima, Riu Kiu).

Hepatus guntheri JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 477, fig. 29. Honolulu.

Teuthis nigrofuscus (not FORSKÅL) BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 779 (Natal).

A dark species with the depth 2, variably with dark longitudinal bands on soft dorsal and anal. Caudal deeply emarginate.

Natal, Madagascar, Mauritius, Bourbon, Seychelles, Celyon, India, East Indies, Philippines, Riu Kiu, Queensland, Melanesia, Micronesia, Polynesia, Hawaii.

52743 U.S.N.M. Hawaiian Islands. Bureau of Fisheries.

55485 U.S.N.M. Honolulu. Dr. O. P. Jenkins. 3 examples.

83274 U.S.N.M. No locality. Wilkes Exploring Expedition. Length 172 mm.

HEPATUS MINDORENSIS (Herre)

Acanthurus mindorensis Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 433, pl. 4, fig. 2. Calapan and Bantayan Island.

Black, blackish brown on head and breast. Deep brown basal caudal ring. Fins black. Length 184 mm.

Differs from *H. fuliginosus* in the concave upper frontal profile.

HEPATUS DOREENSIS (Valenciennes)

Acanthurus doreensis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 220. Doreh Harbor, New Guinea.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 332 (copied).

Valenciennes gives but 20 anal rays. Brown with hind caudal edge whitish and pectoral yellowish above. Length 200 mm.

HEPATUS MATA (Cuvier)

Acanthurus mata Cuvier, Hist. Nat. Poiss., vol. 10, 1835, p. 202 (on *Mata* Russell, Fishes of Coromandel, vol. 1, 1803, p. 64, pl. 82, Vizagapatam). Mariannes (young).—Day, Fishes of India, pt. 2, 1876, p. 205, pl. 48, fig. 1 (Madras).

Hepatus mata Jordan and Starks, Ann. Carnegie Mus., vol. 11, Nos. 3–4, November 5, 1917, p. 459 (Ceylon).

According to Day this species is uniform blackish-brown, the lips and fins black. Klunzinger later places it as a synonym of *Chaetodon gahm* Forskål. Day's example was 184 mm. and the species was reported to him 456 mm.

HEPATUS THOMPSONI Fowler

Hepatus thompsoni Fowler, Occas. Papers Bishop Mus., vol. 8, No. 7, 1923, p. 386. Honolulu.—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Wake Island).

Differs from *Hepatus mata* in the presence of a black blotch in the pectoral axil which shows below the base of the pectoral.

HEPATUS ELONGATUS (Lacépède)

Chaetodon elongatus Lacépède, Hist. Nat. Poiss., vol. 4, 1802, pp. 454, 473, pl. 6, fig. 2. The Great Ocean (Indo-Pacific).

Hepatus elongatus Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 389 (Honolulu and Hookena).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Cagayancillo).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa record).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (Wake Island).

Acanthurus nigroris Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 208. Hawaiian Islands.—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 428, pl. 4 fig. 1 (Hamilo; Guam).

Acanthurus nigros Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 332. Aneiteum, New Hebrides; Journ. Mus. Godeffroy, vol. 4, 1875, p. 110 (type; Pelew Islands and Tahiti).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 532 (coast of Samar).—Ishikawa and Matsuura, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 34.

Hepatus aquilinus JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 353, fig. 66. Apia, Samoa.

Distinguished chiefly by its uniformly dark-brown coloration and the addition of a black spot at the bases of the last dorsal and anal rays.

Melanesia, Micronesia, Polynesia, Hawaii.

51048 U.S.N.M. Hawaiian Islands. Bureau of Fisheries.
5234 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Three examples.
55091 U.S.N.M. Hawaiian Islands. *Albatross* collection. Four examples.
66050 U.S.N.M. Truk Island. *Albatross* collection.
51759 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Type of *Hepatus aquilinus*.

HEPATUS LEUCOPAREIUS (Jenkins)

Teuthis leucopareius JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 476, fig. 28. Honolulu.

Hepatus leucopareius JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 386, fig. 167 (Honolulu, Hilo, Waikiki).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam), p. 28 (Honolulu); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Philippines).

Teuthis umbra JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 477. Honolulu.—JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), pl. 47.

Teuthis bishopi BRYAN and HERRE, Occas. Papers Bishop Mus., vol. 2, No. 1, 1902, p. 134. Marcus Island.

Hepatus celebicus (not BLEEKER) FOWLER, Copeia, No. 58, June 18, 1918. p. 64 (Philippines).

A deep-bodied species, the depth 1½ to 2, and color dark brown. Broad whitish band from spinous dorsal origin down over postocular and narrower pale band across caudal base transversely.

Melanesia, Micronesia, Polynesia, Hawaii.

52456 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 48 to 137 mm. Two examples.
55582 U.S.N.M. Puako Bay, Hawaii. *Albatross* collection. Two examples.
65672 U.S.N.M. Cook Bay, Easter Island. *Albatross* collection. Length 215 mm.
50712 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Type of *Teuthis leucopareius*.
83261 U.S.N.M. No locality, likely Oceania? Wilkes Exploring Expedition. Length 83 mm.

HEPATUS CHRYSOSOMA (Bleeker)

Acanthurus chrysosoma BLEEKER, Nat. Tijds. Nederland. Indië, vol. 13, 1857, p. (56) 67. Kajeli, Buru; vol. 20, 1859–60, p. 206 (Boleling, Bali).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 332 (copied).

Known by its uniform yellow color, vertical fins edged with dusky. The types do not exceed 51 mm.

East Indies and Polynesia.

HEPATUS MARGINATUS (Valenciennes)

Acanthurus marginatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 221. No locality. [Caroline Islands.]—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 133 (copied); Journ. Mus. Godeffroy, vol. 4, 1875, p. 111

(copied).—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 427, pl. 3, fig. 2 (China Sea near Mariveles Point).

Acanthurus guttatus (not SCHNEIDER) KITTLITZ, Mus. Senckenb., vol. 1, 1834, p. 194, pl. 13, fig. 4 (Luganor, Carolines).

Reddish-brown, with scattered blue dots on head and trunk. Vertical fin blackish-brown. Dorsal and anal with blue edges. Reaches 114 mm. (Kittlitz).

HEPATUS PHILIPPINUS (Herre)

Acanthurus philippinus HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 434, pl. 5, fig. 1. Calapan, Mindoro Island.

Depth 2 to 2⅕; head 3⅔ to 3⅞, width 1⅔ to 1⅞. Snout 2 to $2\frac{1}{10}$; eye 3 to 4, 1¼ to 1⅘ in snout, 1 to 1⅓ in interorbital; teeth 22 or 23 in each jaw; maxillary 4⅕ to 4⅓ in head; interorbital 2½ to 3, broadly convex; opercle and preopercle flange with vertical striae or grooves. Gill rakers 6+10, short, flexible points. Scales with extremely fine circuli; apical denticles 14 to 16, and 4 series of low ones transversely as basal elements.

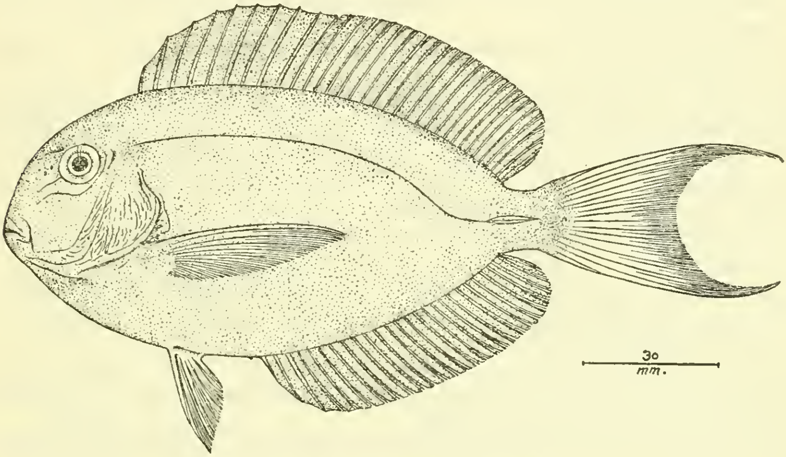

FIG. 11.—HEPATUS PHILIPPINUS (HERRE)

D. IX, 24 or 25, ninth spine 1⅞ to 2 in head; fourteenth ray 1½ to 1⅔; A. III, 24 or 25, third spine 2⅔ to 2⅘, first ray 1⅞ to 2; caudal deeply lunate with long slender points, 2⅕ to 2⅔ in combined head and body; least depth of caudal peduncle 2⅓ to 2⅘ in head; pectoral 3 to 3⅛ in combined head and body; ventral 1⅕ to 1¼ in head; caudal spine 2½ to 3¼.

Easily known by its bright yellow caudal fin, well contrasted with its general dark chocolate color. Iris olive-dusky. Dorsals, anals and paired fins more or less dusky, latter with neutral or deep gray tints, sometimes with olive tinge on pectoral basally. Reaches 220 mm.

Known from the Philippines through our series of examples listed below, besides the type described by Herre. A very well marked species with the front profile evenly and convexly rounded. The light-yellowish caudal fin, in contrast with the rest of the general dark uniform coloration will readily distinguish the species.

9970. Busin Harbor, Burias Island. March 8, 1909. Length 200 mm.

271, 6077, 9968, 9969, 9971, 10966 to 10968, 16414. Cagayanes Island. March 31, 1909. Length 165 to 200 mm.

15483, 15484. Cebu market. March 26, 1909. Length 182 to 187 mm.

21416, 21417. Quinalasag Island, Masamat Bay. June 12, 1909. Length 174 to 190 mm.

7003, 7004. Stream at Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 190 to 198 mm.

7907. Tulnalutan Island. September 9, 1909. Length 203 mm.

8, 6892, 6893. Danawan Island and Si Amil Islands. September 26, 1909. Length 165 to 176 mm.

20470, 21462. Danawan Island and Si Amil Islands. September 27, 1909. Length 100 to 110 mm. Three examples.

8885, 14372, 14373. Mabul Island. September 29, 1909. Length 158 to 200 mm.

A1084, A1085. Maitara Island. November 26, 1909. Length 203 to 220 mm.

7001, 7002, 17305 to 17308. Sipadan Island. September 28, 1909. Length 150 to 205 mm.

14416. Talisse Island, November 9, 1909. Length 103 mm.

13614, 13616. Doworra Island, Dutch East Indies. December 2, 1909. Length 190 to 193 mm.

14320. Basa Reef, Gulf of Boni, Celebes. December 17, 1909. Length 190 mm.

12927, 13417, 14635. Buka Buka Island, Totomi Gulf, Celebes. November 20, 1909. Length 168 to 178 mm.

21117. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 112 mm.

9710, 21451, 21452. Una Una Road, Binang Unang Island, Celebes. November 17, 1909. Length 146 to 175 mm.

13631 to 13633. Una Una Road. November 18, 1909. Length 165 to 180 mm.

15034. Tidore Island, south of Ternate. November 24, 1909. Length 186 mm.

HEPATUS SOHAL (Forskål)

Chaetodon sohal Forskål, Descript. Animal., 1775, pp. xiii, 63. Arabia.—Walbaum, Arted. Pisc., vol. 3, 1792, p. 441 (copied).

Acanthurus sohal Schneider, Syst. Ichth. Bloch, 1801, p. 215 (copied).—Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 56, pl. 16, fig. 1 (Red Sea).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 227 (Red Sea).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 334 (Red Sea).—Martens, Verh. zool. bot. Ges. Wien, vol. 16, 1866, p. 378 (Missa Elei, Red Sea).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 507 (Red Sea).

Acanthurus (*Rhombotides*) *sohal* Klunzinger, Fische Roth. Meer., 1884, p. 83.

Chaetodon sohar Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1268 (copied).

Aspisurus sohar Lacepédè, Hist. Nat. Poiss., vol. 4, 1802, pp. 556, 557 (copied).

Acanthurus carinatus Schneider, Syst. Ichth. Bloch, 1801, p. 216. Arabia.

D. VIII, 32; A. III, 29. Caudal deeply lunate. Brownish gray, with 15 to 17 longitudinal whitish or bluish lines, separated by dark interspaces. Vertical fins black, bordered all around with blue. Length 400 mm. (Klunzinger.)

We have examined a single example, 21294 U.S.N.M., without data, 157 mm. long. It has black circle at shoulder and hind caudal edge white.

HEPATUS FLAVOGUTTATUS (Kittlitz)

Acanthurus flavoguttatus KITTLITZ, Mus. Senckenb., vol. 1, 1834, p. 195, pl. 13, fig. 5. Caroline Islands.—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 112 (copied).

Acanthurus ketlitzi VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 222. No locality.

According to Kittlitz greenish brown with 8 longitudinal yellowish waved lines on body, 3 on dorsals and anals and 3 transversely on caudal. Head and breast spotted with yellowish. Length 127 mm.

HEPATUS LINEATUS (Linnaeus)

Chaetodon lineatus LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 274. East Indies; Syst. Nat., ed. 12, vol. 1, 1766, p. 463.—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1246 (India).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 441 (on LINNAEUS).—FORSTER, Fauna Indica, 1795, p. 15.

Chetodon lineatus BONNATERRE, Tabl. Ichth., 1788, p. 84, pl. 45, fig. 172 (East Indies).

Acanthurus lineatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 223 (Waigiu, Oualan).—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 263 (Priaman, Cauer); vol. 6, 1854, p. 517 (Oelukan); vol. 13, 1857, p. 478 (Karangbollong, Java); vol. 17, 1858–59, p. 130 (Atapoepoe, Timor); vol. 19, 1859, p. 331 (Patjitan, Java), p 333 (Karangbollong); vol. 20, 1859–60, p. 203 (Karangbollong); Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48; Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 1, No. 5, 1856, p. 75 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Manado); vol. 3, No. 9, 1857–58, p. 4 (Trusan); vol. 5, No. 8, 1858–59, p. 2 (Tobariri, Celebes).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 333 (Malay Archipelago, Amboina, Philippines).—BLEEKER, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 15, 1863, p. 266 (Ternate).—KNER, Reise Novara, Fische, 1865, p. 210 (Tahiti).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 111, pl. 70 (Zanzibar, Samoa, Tahiti).—DAY, Fishes of India, pt. 2, 1876, p. 203 (Andamans).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (North Celebes).—DAY, Fauna Brit. India, vol. 2, 1889, p. 138 (Andamans).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 532 (Luzon, Cavite, Santa Cruz).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 317 (Karakelang, Gisser, Binongka, Nusa Laut, Tuir, Rotti).—PEARSON, Ceylon Admin. Rep. Marine Biol., 1914, p. E7.—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 420, pl. 14, fig. 1 (Paraoir, Batangas, Manila, Sibutu; Paoay; Guam).

Ctenodon lineatus SWAINSON, Nat. Hist. Anim., vol. 2, 1838, p. 333 (on BENNETT).

Harpurus lineatus LICHTENSTEIN, Descript. Animal. Forster, 1844, p. 216 (Indies).

Rhombotides lineatus BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 270 (Atopupu, Timor); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 16, 1864, p. 368 (Aru Island, Moluccas); vol. 2 (2), 1868, p. 276 (Batjan).

Hepatus lineatus JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Cagayancillo).

Acanthurus striatus QUOY and GAIMARD, Voy. Uranie, Zool., 1824, p. 373, pl. 63, fig. 3. Mariannes Archipelago, Guam.

Acanthurus vittatus BENNETT, Fishes of Ceylon, 1827, pl. 2. Ceylon.

Acanthurus barav (MONTROUZIER) THIOLLIÈRE, Fauna Woodlark, 1857, p. 179 (name in synonymy).

Depth 1⅞ to 2; head 3¾ to 4, width 1⅘ to 2. Snout 1¼ to 1⅓; eye 3⅔ to 5, 2⅘ to 3⅖ in snout, 1⅓ to 1⅘ in interorbital; teeth 12 to 16 in jaws, large; maxillary 3¼ to 3⅔ in head; interorbital 2⅗ to 2⅔, convexly elevated; only humeral arch with few fine striae. Gill rakers 5+11, short, flexible points.

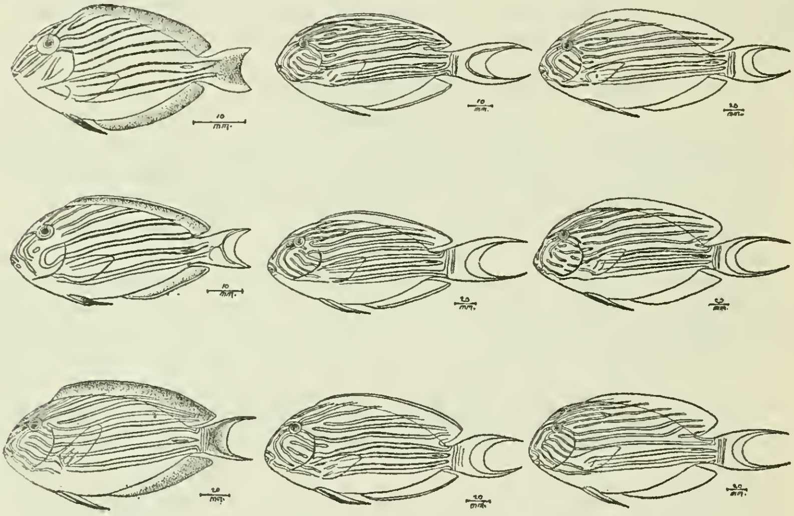
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.
10 mm.

FIG. 12.—VARIATION OF COLOR MARKINGS OF HEPATUS LINEATUS (LINNAEUS)

Scales broad, large, very compact and narrowly imbricated, circuli very minute; apical denticles 33 to 41, with 7 to 9 transverse series of basal elements often more or less complete cusps.

D. IX, 26, I or 27, I, last spine $1^5/_6$ to 2 in head, twenty-third ray 1⅖ to 1⅗; A. III, 26, I or 27, I, third spine 2⅗ to 2⅞, twenty-third ray 1⅗ to 1⅔; caudal deeply lunate or emarginate, points prolonged, fin 2⅖ to 2¾ in combined head and body; least depth of caudal peduncle 2 to 2⅛ in head; pectoral 3⅖ to 3½ in combined head and body; ventral 3⅛ to 3⅘; caudal spine 2¼ to 2⅖ in head.

Brown generally, with little tinge of gray or drab, little paler and uniform below level of pectoral base. Above 9 or 10 pairs of deep brown longitudinal parallel lines, within each pair very narrow blue line and other paler interspaces wider than either of dusky or dark lines. On front of head first 2 bands curve down and backward so all those on cheek parallel. At caudal base bands abruptly end and 2 on caudal base transversely, greater median part of fin dusky brown but separated from broad brown margin by narrow lunar blue line. Dorsals deeper brown than body and marked with many parallel longitudinal bluish lines, posteriorly these continuations of blue longitudinal lines within dark bands. Anal brown, with obscure brownish longitudinal bands. Both edges of dorsals and anals narrowly blue. Pectoral brownish, with 1 or 2 short irregular bluish lines mostly longitudinal and basal. Ventral whitish, front border broadly dusky in contrast and with very narrow anterior blue margin.

Zanzibar, India, East Indies, Philippines, Polynesia. The most striking species of the family, and easily known by its very conspicuous longitudinal lines or bands.

8957, 8958, 16606, 16607. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 232 to 242 mm.

6513. Balikias Bay. July 17, 1908. Length 260 mm.

13400. Bito Lake, Abuyog, Leyte. July 26, 1909. Length 183 mm.

9820. Cagayan, Sulu Island. January 8, 1909. Length 225 mm.

270. Cagayanes Island. March 31, 1909. Length 215 mm.

8863 to 8865. Canimo Island. June 15, 1909. Length 252 to 290 mm.

A1539. Doc Can Island. January 7, 1910. Length 215 mm.

4586 to 4588. Grande Island reef, Subig Bay. January 8, 1908. Length 237 to 240 mm.

9206, 9207. Hermano Major Island. May 8, 1909. Length 235 to 237 mm.

5159. Jolo, Jolo Island. March 6, 1908. Length 263 mm.

4667, 4668. Limbones Cove. January 14, 1908. Length 248 to 275 mm.

8731. Little Santa Cruz Island. May 28, 1908. Length 182 mm.

7424. Malcochin Harbor, Linapacan Island. December 18, 1908. Length 278 mm.

9046. Panabutan Bay, Mindanao. February 6, 1908. Length 220 mm.

6384, 6385. Port Jamelo. July 13, 1908. Length 230 to 238 mm.

7042. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 228 mm.

8985. Rapu Rapu Island. June 22, 1909. Length 255 mm.

5698. Sabtan Island. November 8, 1908. Length 217 mm.

6902, 6903, 19161. Santo Domingo de Bosco, Batan. November 7, 1908. Length 190 to 240 mm.

14017. Santo Domingo de Bosco, Batan. November 17, 1908. Length 168 mm.

15192. Taganak Island. January 7, 1909. Length 223 mm.

7348. Tara Island. December 14, 1908. Length 257 mm.

6479, 6480, 10384 to 10386. Tilig, Lubang Island. July 15, 1908. Length 178 to 250 mm.

7140. West coast of Palaui Island. November 18, 1908. Length 262 mm.

6980. West coast of Sabtan Island. November 8, 1908. Length 243 mm.

15131 U.S.N.M. Samoa. A. B. Steinberger. Length 255 mm.

47861 U.S.N.M. Solomon Islands. Australian Museum. Length 173 mm.

52315 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 50 to 236 mm. Twelve examples.

HEPATUS UNDULATUS (Valenciennes)

Acanthurus undulatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 205. Indian Ocean.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 335 (copied).

Depth little over 2 in length. Snout profile nearly straight. D. IX, 26; A. III, 24. Caudal concave behind. Pale brown, each side with 12 or 13 whitish undulated lines, ascending posteriorly. Dorsal and anal brown. Caudal yellowish. Length 102 mm. (Valenciennes.)

HEPATUS BLEEKERI (Günther)

Acanthurus bleekeri Günther, Cat. Fish Brit. Mus., vol. 3, 1861, p. 335 (on *Acanthurus mata* Bleeker, not Cuvier, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 432. Batavia).—Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 153 (Galela, Halmaheira).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 509 (Red Sea).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 318 (Macassar).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 423, pl. 14, fig. 2 (Agutaya, Subic Bay, Antique Province in Panay).

Acanthurus (*Rhombotides*) *bleekeri* Klunzinger, Fische Roth. Meer., 1884, p. 85 (Koseir).

Acanthurus mata (not Cuvier) Bleeker, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 432 (Batavia, Java); vol. 8, 1855, p. 393 (Amboina); vol. 9, 1855, p. 284 (Manado, Celebes); vol. 11, 1856, p. 95 (Banda), p. 253 (Laboeha, Batjan); vol. 12, 1856, p. 508 (Wahaai, Ceram); vol. 17, 1858–59, p. 143 (Boleling, Bali); vol. 22, 1860, p. 113 (Buru), p. 249 (Timor); Verh. Batav. Genootsch. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48; Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 8 (Macassar), p. 31 (Manado); vol. 2, No. 7, 1857, p. 5 (Amboina); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 15, 1863, p. 21 (Hitu, Amboina).—Thurston, Gov. Central Mus. Madras (Pearl Fish. Manaar), 1890, p. 92 (Tuticorin, Pambas).—Pearson, Ceylon Admin. Rep. Marine Biol., 1912–13, p. E6.

Teuthis mata Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 26, No. 7, 1911, p. 310 (Rangiroa, Fakarava).

Acanthurus aureolineatus Day, Fishes of India, pt. 2, 1876, p. 204, pl. 48, fig. 3. Waltair, Coromandel Coast.

Harpurus gnophodes Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, June 10, 1904, p. 544, pl. 22, upper fig. Padang, Sumatra.

Depth 1⅞ to 2¼; head 3⅖ to 3⅞, width 1⅞ to 2. Snout 1⅘ to 1⅞; eye 3⅛ to 5, 1¾ to 2⅗ in snout, 1⅞ to 1⅚ in interorbital; teeth 20 to 22 in each jaw; maxillary 3⅖ to 4¼ in head; interorbital 3 to 3⅛, convexly elevated; opercle with a few vertical, obscure grooves. Gill rakers 5 + 12, short, feeble, cuneate points.

Scales with minute circuli; apical denticles 11 to 13, with 4 or 5 series of transverse basal elements.

D. IX, 26, i or 27, i, ninth spine 1⅖ to 1⅘ in head, fifth ray 1⅓ to 1⅖; A. III, 24, i or 25, i, third spine 1⅞ to 2¼, first ray 1⅔ to 1¾; caudal deeply lunate, 2⅔ to 2¾ in combined head and body; least depth of caudal peduncle 2⅞ to 3 in head; pectoral 3⅛ to 3¼ in combined head and body; ventral 1⅕ to 1¼ in head.

Chocolate or umber brown generally, ground tint more or less uniform. Head and body with about 20 or more gray blue longitudinal lines, of which about 10 cross head; these lines all variable and mostly faded from trunk and tail. Iris brown with light olive gray to yellowish tints. Fins all more or less dusky, soft dorsal and anal with traces of 6 or 7 darker longitudinal lines. Pectoral dark olivaceous and ventral dusky, with grayish. Hind edge of opercle narrowly dusky. Pale blue line along dorsal base and dusky brown line along edge of back.

Red Sea, India, Ceylon, East Indies, Philippines, Polynesia.

We feel certain that the young example described by Day is the present species, and that its so-called yellow coloration is the result of preservation. Day mentions that his example was captured "some years since"! We find a still smaller example than Day's type and it shows a brown coloration like our other specimens. Moreover its tail is slightly emarginate, as Day shows. *Harpurus gnophodes* is the adult stage, with greatly increased narrow blue longitudinal lines and many having faded from the type. We are thus able to establish the species with some indication of its life cycle.

A499, A500. Balukbaluk Island. September 12, 1909. Length 290 to 305 mm.

A557. Bulan Island. September 13, 1909. Length 295 mm.

8457. Cagayanes Island. March 31, 1909. Length 334 mm.

A1534, 14622. Doc Can Island. January 7, 1910. Length 138 to 270 mm.

7498, 9253. Endeavor Strait, Malampaya Sound, Palawan Island. December 22, 1908. Length 220 to 250 mm. Very dark purplish slate, with numerous narrow purple stripes. Fins not barred.

8221, 8222, 8252. Galvaney Island, Ragay Gulf, Luzon. March 9–14, 1909. Length 238 to 383 mm.

9915. Inamucan Bay, Mindanao. August 8, 1909. Length 140 mm.

6948. Jolo Market. May 31, 1908. Length 80 mm.

8228. Maculabo Island. June 13, 1909. Length 303 mm.

10816. Murcielagos Bay, Mindanao. August 20, 1909. Length 150 mm.

9346. Murcielagos Bay. August 21, 1909. Length 258 mm.

14651. Parang, Mindanao. May 23, 1908. Length 224 mm.

5894, 5895. Polloc, Mindanao. May 22, 1908. Length 245 to 260 mm. Seal brown, with numerous pale blue stripes, most pronounced on side of head and upper part of body.

14046. Sacol Island. September 9, 1909. Length 156 mm.

12209. Santa Cruz Island, Marinduque. April 24, 1908. Length 208 mm.

4898. Siasi Island, Masbate. February 17, 1908. Length 255 mm. Seal brown generally. Many narrow slate gray stripes along side of head and body, about wide as interspaces, somewhat irregular on back and lower parts, tending to follow profiles of body. Broad yellow stripes pass through eye across top of opercle. Branchiostegal membrane edged black. Iris dark brown, with some bronze. Dorsal like body, somewhat yellowish, margins distinctly black; several indistinct narrow slaty bars, probably marked in life. Anal like dorsal with 4 narrow slaty bars. Pectoral dusky, darkest basally. Ventral brown.

A624. Simaluc Island. September 22, 1909. Length 268 mm.

A652, 17098. Simaluc Island. September 23, 1909. Length 163 to 298 mm.

A555. Sulade Island. September 18, 1908. Length 335 mm. Ground color slaty, fading olive yellowish. Side of head and body with numerous horizontal indigo purple stripes. On fading sulphur yellow band through eye. Dorsal and anal without bars, ground color very dark olive and edges blackish. Caudal slaty, without definite markings. Paired fins like body color.

A625. Singaan Island. September 21, 1909. Length 288 mm.
A714. Si Amil Island. September 27, 1909. Length 369 mm.
A1113. Makyan Island. November 28, 1909. Length 295 mm.
14740. Limbe Strait, Celebes. November 10, 1909. Length 193 mm.
66053 U.S.N.M. Fakarava. *Albatross* collection. Length 320 mm. As *Teuthis mata.* It agrees largely with Fowler's figure of *Harpurus gnophodes* which we believe to be the adult. The Fakarava example shows more blue horizontal lines than is indicated by the figure in question, these doubtless having largely faded.

HEPATUS BARIENE (Lesson)

Acanthurus bariene Lesson, Voy. Coquille, Zool., vol. 2, 1830, p. 150. Offack Bay, Waigiu.—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 409, pl. 1, fig. 2 (Ibajay, Tablas, Ambil, Maricaban, Bantayan, Visayas).

? *Acanthurus argenteus* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 372, pl. 63, fig. 2. Guam. (Young).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 239 (Hawaii and Mariannes).

Acronurus argenteus Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 346.—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 510 (Koseir, Red Sea).

Teuthis argenteus Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 553 (Okinawa, Umesawa, Misaki).

Acanthurus dussumieri Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 201. Mauritius.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 335 (copied).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 112, pl. 72 (Mauritius and Hawaiian Islands).—Sauvage, Hist. Nat. Madagascar, 1891, p. 337.—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 425, pl. 14, fig. 3 (Olongapo, Linapacan, Agutaya, Sibuyan, Masbate, Tablas, Bantayan).

Hepatus dussumieri Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa, Riu Kiu).—Tanaka, Fish. Japan, vol. 23, 1916, p. 408, pl. 111, fig. 334 (Okinawa, Sagami Sea).

Acanthurus nummifer Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 234. Waigiu (also type of *Acanthurus bariene* Lesson).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 338 (copied).

Acronurus lineolatus (not Valenciennes) Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 511 (Koseir, Red Sea).

Hepatus xanthopterus (not Valenciennes) Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 389 (Honolulu).

Depth $1\frac{7}{8}$ to $2\frac{1}{10}$; head $3\frac{1}{3}$ to $3\frac{4}{5}$, width $1\frac{7}{8}$ to $2\frac{1}{8}$. Snout $1\frac{1}{5}$ to $1\frac{2}{5}$; eye $3\frac{3}{4}$ to 5, $2\frac{3}{4}$ to 5 in snout, $1\frac{1}{5}$ to 2 in interorbital; teeth 20 to 22 in each jaw; maxillary $3\frac{2}{3}$ to $4\frac{2}{5}$ in head; interorbital $2\frac{4}{5}$ to $3\frac{1}{5}$, convexly elevated; opercle, preopercle flange and humeral arch with rather obsolete striae. Gill rakers 6 to 8 + 13 or 14, low, small points.

Scales small, ovoid, circuli extremely fine; apical denticles 11 to 25, with 6 to 12 series of basal elements transversely as low cusps.

D. IX, 25, i to 26, i, ninth spine $1\frac{1}{2}$ to 2 in head, first ray $1\frac{1}{5}$ to $1\frac{4}{5}$; A. III, 23, i to 26, i, third spine $2\frac{1}{6}$ to $2\frac{2}{3}$, first ray $1\frac{4}{5}$ to $2\frac{1}{10}$; caudal deeply emarginate, lunate, $2\frac{1}{8}$ to $2\frac{2}{3}$ in combined head and body; least depth of caudal peduncle 2½ to 2⅞ in head; pectoral 1 to 1⅙; ventral 1 to 1⅓; caudal spine 2⅞ to 5.

Largely dull chocolate to umber brown, with more or less dull uniform tinge. Many fine dark or dusky longitudinal parallel lines on head and body. Sometimes a pale ill-defined interocular band. Edge of opercle or gill opening sometimes narrowly dark. Iris yellowish brown. Caudal spine often with groove dusky to blackish. Dorsals, anals and caudal largely dusky brown, former two fins with narrow blue border and also narrow basal line to same of each basally. Base of caudal with pale whitish transverse band, variously distinct, often not evident. Sometimes caudal with traces of dark spots. Paired fins uniformly brown, variously dark to dusky.

Red Sea, Mauritius, Madagascar, East Indies, Philippines, Riu Kiu, Japan, Micronesia, Polynesia, Hawaii.

This species was supposed to differ from the nominal *Acanthurus dussumieri* in the black postocular spot and the dark lines on the cheek reticulated besides a few dark submarginal lines on the dorsals and anals. It is allied with *Hepatus nigrofuscus* in the pale transverse basal caudal band, but differs, as above, the postocular blotch not extending over on the suprascapula. Moreover it resembles *Acanthurus dussumieri* in the blue line at both bases of dorsal and anal.

7805. Bugsuk Island. January 5, 1909. Length 230 mm.

8796. Butauanan Island. June 12, 1909. Length 277 mm.

7795. Candaraman Island, Balabac. January 4, 1909. Length 388 mm. General color brownish. Several orange red lines before eye. Fins more or less brownish like body. Dorsals and anals with numerous narrow black-blue lines or bars posteriorly; outer margins of fins blue. Caudal margin within fork blue, outer edge white. Pectoral tip yellowish.

8994. Gubat Bay. June 23, 1909. Length 235 mm.

8810, 8811. Maculabo Island. June 13, 1909. Length 263 to 375 mm.

8840. Maculabo Island. June 14, 1909. Length 283 mm.

8368. Malapascua Island. March 16, 1909. Length 408 mm. Purplish brown, with dull slate stripes on side of head, little distinct. Yellowish about eye, most conspicuous behind eye and above corner of gill opening where obscurely bordered with dusky purple. Body without stripes or lines. Dorsals and anals with narrow purplish borders and many purplish bars, best seen as fin is held against light. Caudal rays purplish, bright terminally, and margin of fin in fork pale but not white. Caudal spine with black socket. Pectoral dusky olive, somewhat purplish on outer surface without distinct color divisions. Ventral dusky olive.

6164. Mansalay, Mindoro Island. June 4, 1908. Length 308 mm.

8596. Matnog Bay. May 31, 1909. Length 213 mm.

9285 to 9287. Murcielagos Bay. August 9, 1909. Length 295 to 355 mm.

8212. Pagapas Bay, Luzon. February 20, 1909. Length 437 mm.

7043. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 330 mm. General color brown, on fading centers of scales on back and sides becoming more or less brassy. On upper side and back numerous narrow slaty blue lines. Head similar to body, only slightly darker. Cheek with numerous small lighter spots, nearly umber. Black-centered, blue-rimmed ocellus about ½ of eye above upper angle of gill opening. Opercle flap blackish. Undefined orange brown bar from shoulder ocellus downward behind pectoral axil. Dorsal orange brown, very narrowly margined indigo with inframarginal black line. Several narrow slaty black bars across soft dorsal tip, 2 or 3 broken across spinous portion and bars reaching even base of fin on second and third spinous membranes; last 5 or 6 rays with blackish blotch; bright indigo bar at base of fins nearly half pupil diameter, becoming broader anteriorly. Anal like dorsal, blackish posterior part more pronounced. Caudal with obscure white at base and on tips of caudal peduncle; fin medially purplish, without bars; lobes with orange brown shades, in form of definite spots on terminal half as 2 or 3 rows. Pectoral brownish, without yellowish stripe and somewhat purplish shades medially. Ventral brownish.

7112. Port San Pio Quinto. November 12, 1908. Length 235 mm. General body color dark chocolate brown, with slaty stripes. Yellowish brown below and behind opercle with dark wavy lines of body color across yellowish brown patch behind opercle which below and before pectoral base; lines and spots across post-pectoral area most evident. Black ocellus, with slaty rim, at upper angle of opercle, slightly smaller than eye. Lips slaty over brown. Iris like body. Cheek mottled with lines and spots of light brown. Dorsal with deep blue basal band and narrower marginal band; body of fin yellowish brown, darker at base and near margin; 5 or 6 long waved slaty lines longitudinally along upper half of dorsal fin; traces of lines below, especially anteriorly. Anal like dorsal but much darker, bars present but much obscured by general tone. Broad whitish bar at caudal base and posterior end of caudal peduncle, merging into origin at fin edge; orange extends posteriorly beyond whitish bar along external rays of caudal and breaks into round dots over outer half of lobes; rest of caudal blackish. Pectoral brown, membranes hyaline. Ventral similar, nearly black.

8982, 8983. Rapu Rapu Island. June 22, 1909. Length 245 to 338 mm. Side brown, with stripes of bluish. Head with more or less orange wash after fading; top and side of head and breast with narrow, more or less undulating slate blue lines, about ¼ diameter of interspaces. Caudal with white basal bar fused more or less with color of fin. Dorsal and anal with few dusky stripes, only distinct terminally on soft portions; orange stripe at dorsal base. No shoulder blotch. Caudal spine with black socket. Caudal shows dark bars in alcohol.

8212. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 432 mm. Generally rufous to tawny, fading nearly chocolate to olive yellow; side with numerous slate blue or indigo stripes, following scale rows more or less undulating and anastomosing. Breast tawny, without stripes, these breaking into spots above vent and behind gill opening. Some vertical stripes immediately behind gill opening. On side of head slaty becomes ground color with tawny appearing as very thickly scattered rounded or irregular spots. Immediately above forehead and front of head below without spots. Broad purplish stripe across maxillary, upper lip somewhat purplish, also lower, and somewhat reticulated purplish slaty stripes on chin and front of breast, these about twice breadth of stripes on sides. Black blotch, nearly equal to eye, above upper angle of gill opening.

9400. Sacol Island. September 8, 1909. Length 320 mm. Small orange spots on cheek and opercle. Small black blotch postocular, less than eye. Dorsal yellow, with narrow bars on front and terminal spinous part and terminal rayed part; margin and base purple. Anal similar, but bars more continuous along margin. Caudal spotted with brown, base white.

7842. Taganak Island. January 7, 1908. Length 235 mm. Generally brown, with narrow slaty stripes, interspaces umber. Head laterally like body, green color forming reticulating lines enclosing paler brown areas; slaty stripe under eye and 1 or 2 indistinct ones before eye, interspaces yellow. Black blotch at upper angle of opercle slightly smaller than eye. Chin and breast tinged with purple. Dorsal yellowish brown, edge bright blue on narrow black submarginal line; below latter broader broken lines of slaty blue; on soft fin forming chord to margin, short lines near vertical edge parallel but diminishing downward; blue basal bar with narrow yellowish brown bar beneath as fish fades. Anal like dorsal. Caudal pale, probably whitish basally in life. Paired fins brown, without yellow on terminal portion of pectoral.

8530. Verde del Sur, Palawan reef. April 7, 1909. Length 275 mm. Sides with longitudinal gray lines. Tawny area behind gill opening, ⅔ eye diameter, forms blotch to pectoral base. Side of head mottled with tawny. Purple brown blotch, smaller than eye, above gill opening, becomes black. Dorsal tawny with 3 or 4 bars on soft fin, and short bars on front of spinous fin, posterior rays blackish. Anal with longitudinal bands, only seen by transmitted light. Caudal lobes mottled with tawny along 3 or 4 outer rays, base pale white in life. Pectoral black, darkest on upper rays.

6981, 6982. West coast of Sabtan Island. November 9, 1908. Length 320 to 340 mm. Body uniform bister without stripes or lines. Scales show slight tinge of yellowish brown on fading. No black shoulder marks. Bronze spot above angle of gill opening. Head and breast under pectoral with undulating slate blue lines. Fins colored like body, dorsals more inclined to umber. Dorsals and anals with bright blue margins and fins crossed by numerous dark slaty bars. Caudal peduncle at caudal base with broad whitish bar. Caudal fin black, produced rays purplish and fin medially crossed by numerous, narrow, purple stripes. Paired fins uniform.

A1552. Nan Wan Bay, Formosa. January 25, 1910. Length 290 mm.

1359, 52681, 55342 U.S.N.M. Honolulu. *Albatross* collection. Length 103 to 473 mm. Seven examples.

50791 U.S.N.M. Southern Japan. Imperial University, Japan. Length 118 mm.

52743 U.S.N.M. Hawaii. Bureau of Fisheries. Length 320 mm. As *Hepatus xanthopterus*.

82957 U.S.N.M. Hawaii. Wilkes Exploring Expedition. Length 43 to 57 mm. Two examples.

HEPATUS GRAMMOPTILUS (Richardson)

Acanthurus grammoptilus Richardson, Ann. Mag. Nat. Hist., London, vol. 11, 1842, p. 176. Port Essington, Queensland.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 335 (types).

Teuthis grammoptilus McCulloch, Mem. Queensland Mus., vol. 6, 1918, p. 9, pl. 28 (Clarence River).

Acanthurus leucocheilus Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 419, pl. 12, fig. 3. Bantayan, Cebu, Agutaya.

Depth 1⅘ to 2⅛; head 3½ to 3⅔, width 2⅛ to 2½. Snout 1⅓ to 1⅖; eye 4⅛ to 6⅛, 3⅛ to 4½ in snout, 1½ to 1⅞ in interorbital; teeth 18 to 26 in jaws; maxillary 3½ to 3⅘ in head; interorbital 2⅞ to 3, convexly elevated; opercle, preopercle flange and humeral arch striate, striae rather weak. Gill rakers 6 + 12, short points.

Scales rather broadly ovoid, firmly adherent, with very fine, numerous circuli; 5 to 10 rows of apical or subapical tubercles, with 6 to 8 series transversely.

D. IX, 25, I or 26, I, ninth spine 1⅖ to 1¾ in head, first branched ray 1½ to 1⅔; A. III, 23, I or 24, I, third spine 2 to 2⅖, first branched ray 1⅖ to 1¾; caudal deeply emarginate or lunate, lobes extended in long points, 2⅓ to 2⅖ in combined head and body; least depth of caudal peduncle 2⅔ to 2¾ in head; pectoral 1 to 1⅛; ventral 1¼ to 1⅔; caudal spine 5¼ to 5¾.

Largely uniform dull brownish, becoming more or less dusky on back with age. Often pale or ochraceous tints in front of and around eye posteriorly, with traces of dark waved lines more or less horizontal. Iris brownish. Fins all more or less brownish, vertical ones dusky with age. In many examples of small size soft dorsal and anal each with 4 or 5 longitudinal, parallel dark bands. Others also show pale bluish or gray longitudinal band. Pectoral usually brownish with broad, even pale, yellowish border posteriorly, always conspicuous.

Previously only known from Queensland. Our examples agree with Günther's account of Richardson's type. The "very numerous undulated and irregular bluish longitudinal lines" have apparently largely faded, though there are still traces of them in some of the specimens. Likewise the "whitish band across the basal portion of the caudal fin." We do not find the black spot in the basal region of the last dorsal and anal rays. It is in the pale hind border to the pectoral that the most striking and constant character is found, and this will distinguish the species most any time. Although greatly different in the presence of 31 dorsal and 28 or 29 anal rays, besides the dorsals and anals without dark longitudinal bands we feel that this species is very close to *Hepatus sohal* (Forskål), apparently only known from the Red Sea.

8689. Batag Island. June 3, 1909. Length 353 mm.

7803, 7804, 7806 to 7808. Bugsuk Island. January 5, 1909. Length 270 to 370 mm.

(7803, 7804, 7806). Numerous narrow undulating slaty blue stripes, interspaces golden brown. Yellow-brown blotch about eye, two sides not quite meeting. Many very distinct undulating slaty lines on side of head. Opercle flap black. Dorsal yellow carmine, orange anteriorly, smoky purple posteriorly; narrowly edged dark blue; traces of 3 or 4 narrow blue lines on posterior portion terminally. Slaty blue stripes nearly pupil breadth at dorsal base and below brown stripe parallel. Anal like dorsal, with broad blue borders and orange and yellow shades less distinct; trace of blue basal stripe. Caudal purplish, front edges of lobes yellowish. Caudal spine dirty-white, socket blue about borders. Pectoral like dorsal internally, more purple on lower portion externally. Ventral rays bluish or purplish, membranes yellowish.

(7807, 7808). Ground color gray with purplish shades. Yellowish about eye not meeting opposite side in front of eye. Dorsal and anal like body, extreme margin nearly black, with broad band submarginally of yellowish brown nearly width of pupil and 3 similar bars less distinct on rest of each fin. Caudal like body, with white basal bar turning gray in alcohol. Pectorals yellowish, clear lemon yellow terminally above, hyaline below. Ventrals like body, with yellowish shades on membranes.

9238, 9240. Camp Overton, Mindanao. August 6, 1909. Length 260 to 560 mm. Drab brown, paler below with more lavender shade. Side of head and upper body with scattered small blue or purple spots, more evident in fading fish. Snout vermiculate with purplish lines. Yellow shade through eye. Iris brown. Caudal spine black above, whitish in socket. Dorsal and anal terminally olive, body color below yellow, longitudinal bands slaty. Tail uniform. Pectoral terminally yellow about width of orbit.

9110. Gigoso Point, Samar. July 28, 1909. Length 260 mm.

9251. Inamucan Bay, Mindoro. August 8, 1909. Length 260 mm.

5196. Jolo market. March 7, 1908. Length 283 mm.

5973. Little Santa Cruz Island. May 26, 1908. Length 257 mm.

6060. Little Santa Cruz Island. May 28, 1908. Length 590 mm.

8812 to 8814. Maculabo Island. June 13, 1909. Length 255 to 290 mm.

8509, 8510. Makesi Island, Palawan. April 5, 1909. Length 295 to 334 mm. Slaty purplish most pronounced posteriorly, sometimes with distinct waved lateral stripes on side medially. Yellow area before and behind eye. Margin of dorsal and anal olive; usually 3 distinct olive bands on each below margin in dorsal, lowest branching posteriorly; dorsal and anal bands very various, usually 5 or more not including marginal. Caudal purplish, somewhat marked with olive brown terminally but not forming a bar. Pectoral lemon yellow terminally. Ventral body color, darkened with olivaceous. No shoulder mark.

6166. Mansalay, Mindoro. June 4, 1908. Length 332 mm. General color rather light brown. Dorsal and anal with alternate slaty and orange bands. Pectoral yellow terminally and internally.

9282 to 9284. Murcielagos Bay. August 9, 1909. Length 270 to 370 mm.

A933. Pasejogo Island. November 16, 1909. Length 500 mm. Slate brown, becoming bluish posteriorly; scarcely trace of stripes before caudal peduncle; breast and lower head with obscure darker mottling; head and body anteriorly with more or less yellowish wash, becomes distinct as sort of stripe through eye. Dorsal and anal broadly streaked with body color, afterward fading to yellowish and slaty purplish. Caudal like body. Pectorals yellowish, hyaline terminally. Ventrals tinged yellowish.

7113, 7114. Port San Pio Quinto, Camiguin Island. November 12, 1908. Length 245 to 260 mm.

4887. Siasi Island, from fishermen. February 16, 1908. Length 354 mm. Forehead and front part of back dark olive, posteriorly from about middle of dorsal and obliquely toward ventral base covered with indistinct plumbeous vermiculations. Yellowish stripe through eye, yellowish following line of gill opening about breast and pectoral axil. Iris brown with golden lines on edges. Teeth brownish. Caudal spine dusky on under side, top of spine black, keel colorless, socket greenish. Dorsal yellowish-olive, crossed by oblique plumbeous bars, $\frac{2}{3}$ pupil width from in front upward; upper begins at first spine base, rises to near tip of fourth, continued parallel to edge of vertical of fin; above ground color more orange, narrowly margined black; other bars 6; fin base bluish plumbeous, forming narrow stripe about half pupil width. Anal like dorsal, with hyaline at base very indistinct, very similar to body color; plumbeous bars 3. Caudal dusky indian purple. Pectoral yellowish-olive, shades bright lemon yellow on terminal third, extreme edge hyaline. Ventral membranes yellowish, rays with purplish shades.

A653. Simaluc Sibi Sibi Island. September 23, 1909. Length 348 mm.

A1404, A1405. Tampotana Island. December 21, 1909. Length 245 to 265 mm.

A573. Tutu Bay, southern Jolo. September 19, 1909. Length 378 mm.

7171. West coast of Palaui Island. November 18, 1908. Length 392 mm. Very dark olive, paler below, with smoky purplish shades. Brassy before eye, on maxillary and terminal third of pectoral. In fading each scale apparently with bronze mark. Somewhat obscure stripes, below slaty and undulating. Dorsal very dark brownish orange, becomes brassy on fading, more or less crossed by 4 or 5 bars nearly diameter of pupil. Anal like dorsal. Caudal fins purplish, without bars. Paired fins with brassy shades.

A1475. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 525 mm. Slaty brown, with darker lines, upon fading side of head and body with scattered bluish spots little larger than nostril. Yellow wash through eye bright, more or less yellow downward on frontal snout ridge and paler wash over side of head back to pectoral. Dorsal and anal stripes pale slaty. Caudal spine with yellowish socket. Pectoral bright yellow.

8859, 8860. Daet Point. June 15, 1909. Length 370 to 395 mm.

A834, A854. Talisse Island. November 9, 1909. Length 215 to 350 mm.

A888, A886. Limbe Strait, Celebes. November 10, 1909. Length 300 to 508 mm. Slaty stripes on lavender olive ground color. Side of head striped and spotted yellowish-olive through eye. No white on tail. Dorsal margin olive, narrowly black and blue? on edge, with 4 slaty stripes. Pectoral tip yellow.

5104. Sandakan Bay, Borneo. March 2, 1908. Length 303 mm.

A1550, A1553. Nan Wan, Formosa. January 25, 1910. Length 322 to 333 mm.

HEPATUS LINEOLATUS (Valenciennes)

Acanthurus lineolatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 207. Sea of the Indies.—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. (90) 103 (Banda, Neira); Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 336 (copied); Journ. Mus. Godeffroy, vol. 4, 1875, p. 112, pl. 73, fig. A (Raiatea, Society Islands).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Diégo Suarez, Madagascar).

Hepatus lineolatus FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu), p. 34 (Samoa).—FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Laysan, French Frigate Shoals, Johnston Island).

Teuthis atrimentatus JORDAN and EVERMANN, Bull. U. S. Fish. Comm., vol. 22, 1902 (1903), p. 198. Honolulu.

Hepatus atramentatus FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Laysan).

Acanthurus atramentatus HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 422, pl. 3, fig. 1 (Sitankai, Puerto Galera, Sialat Point).

Teuthis matoides (part) JENKINS, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 478 (Honolulu).—JORDAN and EVERMANN, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 387 (Honolulu).

Hepatus nigricans (part) JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 351 (Apia).

Hepatus elongatus (part) JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 352 (Apia).

Teuthis elongatus KENDALL and GOLDSBOROUGH, Mem. Mus. Comp. Zool., vol. 26, No. 7, 1911, p. 308 (Truk).—BARNARD, Ann South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 778 (Natal).

Depth $1\frac{7}{8}$ to 2; head $3\frac{2}{5}$ to $3\frac{3}{5}$, width $1\frac{7}{8}$ to 2. Snout $1\frac{1}{3}$ to $1\frac{4}{5}$; eye 3 to 4, 2 to $3\frac{1}{4}$ in snout; 1 to $1\frac{1}{2}$ in interorbital; teeth 12 to 14 in each jaw, rather large; maxillary 3 to $4\frac{1}{5}$ in head; interorbital $2\frac{3}{4}$ to 3, convexly elevated; opercle, preopercle flange and humeral arch with few coarse, obsolete striae. Gill rakers 5+15, short, weak, flexible points.

Scales very small, broad, with very fine numerous circuli; with 15 to 27 apical denticles, which with 4 or 5 transverse series of basal elements.

D. IX, 24, I or 25, I, last spine $1\frac{4}{5}$ to $1\frac{7}{8}$ in head, first ray $1\frac{1}{3}$ to $1\frac{3}{4}$; A. III, 23, I or 24, I, third spine $2\frac{1}{5}$ to $2\frac{2}{5}$, first ray $1\frac{3}{5}$ to 2; caudal deeply emarginate, lunate, tips long and slender with upper usually little longer, $2\frac{1}{3}$ to $2\frac{2}{5}$ in combined head and body; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{2}$ in head; pectoral $3\frac{1}{8}$ to $3\frac{1}{4}$ in combined head and body; ventral $3\frac{1}{5}$ to $3\frac{1}{4}$; caudal spine 3 to $3\frac{2}{3}$ in head.

Body largely uniform chocolate brown, some examples with pale gray traces of small oblique gray lines on head and very fine longitudinal grayish lines on body. Vertical fins usually little deeper chocolate brown than body, and mostly with blackish spot at bases of few last dorsal and anal rays. Hind caudal edge usually very narrowly whitish. Pectoral brownish, ventrals dusky. Iris brown.

We feel that the *Acanthurus lineolatus* Valenciennes, based on an example but 100 mm. long is this species. It is very briefly noticed with the caudal points extended, the color brownish-black with very fine bluish longitudinal lines and the pectoral greenish. Günther's figure is surely intended for our species, though the caudal is shown as more obtuse and not deeply enough emarginated.

5687, 7675. Agojo Point, Catanduanes Island. June 10, 1909. Length 115 to 118 mm.

14779, 1331. Bagacay Bay, Escarpada Island, Maranjos Group. March 13, 1909. Length 175 mm. Ground color bistre. Sides of head and breast with brown spots. Chin black, rather sharply demarcated on line continuing lower edge of gill opening. No shoulder blotch. Dorsal edged violet black, likely purple in life, fin with 8 or more brown bars, most apparent in transmitted light. Anal similar, purple border much broader, with few bars which obscure. Caudal white in fork, rather darker than body. Pectoral membrane hyaline, upper ray darkest.

16745. Baganga Bay. May 13, 1908. Length 155 mm.

9281. Basot Island, Pocket Bay. June 11, 1909. Length 153 mm.

16814. Butauanan Island. June 12, 1909. Length 160 mm.

14458. Cuyo Island, Cuyo. April 9, 1909. Length 100 mm.

7435, 10776, 10777, 14332. Dalaganem Island. April 8, 1909. Length 150 to 168 mm.

14621. Doc Can Island. January 7, 1910. Length 157 mm.

4591. Grande Island reef, Subig Bay. January 8, 1908. Length 140 mm Uniform black except hind caudal edge which pale blue and golden iris.

14435. Gubat, Sorsogon, Luzon. June 23, 1909. Length 109 mm.

12970, 14640 [1703]. Langao Point, extreme southern Luzon. June 24, 1909. Length 155 to 175 mm. Dark brown. Side of head with small orange spots. No evidence of stripes on side of body. Caudal spine with black socket. Dorsal and anal edged with black and few narrow bars on outer part of soft dorsal. Likely black spot in dorsal and anal axils. Caudal edge nearly white in fork. Pectoral without yellow.

5440, 5441, 7463. Maculabo Island. June 14, 1909. Length 180 to 198 mm.

21286. Malanipa Island. September 8, 1909. Length 138 mm.

11211 to 11213. Matnog Bay. May 31, 1909. Length 172 to 180 mm.

7428, 17162, 17539. Port Matalvi, Luzon. November 23, 1908. Length 140 to 158 mm.

14169. Pujada Bay. May 15, 1908. Length 146 mm.

12705. Reef of South Lagoon, Tumindao Island. February 26, 1908. Length 133 mm.

11402, 19250 to 19252. Sabtan Island. November 9, 1909. Length 110 to 140 mm.

15788. Sabtan Island. November 9, 1909. Length 150 mm.

11923. Siasi Island market. February 17, 1908. Length 160 mm.

12892. Simaluc Island. August 10, 1909. Length 164 mm.

15831 [1993]. Sitanki reef northwest of Tumindao Island. September 24, 1909. Length 145 mm. Brownish after fading. Side of head and breast with numerous small orange specks. Dorsal with brown bars terminally and posteriorly, edge black and black blotch at axil. Anal like dorsal, bars nearly or quite obsolete and edge of fin violet. Caudal with narrow whitish margin in fork resting on black, fin otherwise like body.

1207 [1908]. Tictauan Island. April 8, 1909. Length 180 mm. Reddish brown. Side of head and breast spotted with olive brown. Dorsal with purplish edge, brown bars about equal interspaces. Anal like dorsal, darker. Caudal narrowly tipped white in fork. Pectoral membranes hyaline. Ventral like body color. No shoulder blotch.

14517. Ulugan Bay, Rita Island. December 29, 1908. Length 168 mm.

7342, 14009, 16462, 16463, 16464. West coast of Palaui Island. November 18, 1908. Length 103 to 128 mm.

6966. West coast of Sabtan Island. November 8, 1908. Length 158 mm.

A1554. Nan Wan, Formosa. January 25, 1910. Length 216 mm.

Six examples U.S.N.M. Mauritius. Col. Nicholas Pike. Length 154 to 198 mm.

51048 U.S.N.M. Hawaii. Bureau of Fisheries. Length 140 mm. As *Hepatus bipunctatus.*

52340 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 60 to 168 mm. As *Hepatus elongatus*, but certainly with black spot at last dorsal ray bases and also of anal, also caudal deeply lunate.

One example (with 52496 U.S.N.M.). Apia, Samoa. Bureau of Fisheries. Length 58 mm. As *Hepatus nigricans.*

55091 U.S.N.M. Hawaii. *Albatross* collection. Length 148 to 175 mm. Four examples.

66050 U.S.N.M. Truk Island. *Albatross* collection. Length 40 mm. As *Teuthis elongatus.*

55488 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Length 190 to 273 mm. Three examples. As *Teuthis matoides.* All have pale horizontal lines and smallest without black spot at base of last dorsal and anal rays.

50673 U.S.N.M. Honolulu. Bureau of Fisheries. Type of *Teuthis atramentatus.*

HEPATUS OLIVACEUS (Schneider)

Acanthurus nigricans olivaceus Schneider, Syst. Ichth. Bloch, 1801, pp. xxxviii, 214. Tahiti (on Forster.)

Acanthurus olivaceus Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 336 (type; Fiji).—Bleeker, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 15, 1863, p. 21 (Hitu, Amboina).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 113 (East Indies, Society Islands, Paumotu, Samoa, Pelew Islands, Hawaiian Islands).—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 343 (on *Acanthure à croissant* Liénard, Suppl. rapp. Soc. hist. nat. Maurice, 1836, p. 55).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 318 (Banda).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 413, pl 12, fig. 1 (Subic Bay, Ambil, Agutaya, Jolo).

Hepatus olivaceus Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 385, fig. 166 (Honolulu).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Cagayancillo).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—McCulloch, Mem. Queensland Mus., vol. 7, pt. 4, 1922, p. 243 (Capricorn Group).

Acanthurus eparai Lesson, Voy. Coquille, Zool., vol. 2, pt. 1, 1831, p. 147, pl. 27, fig. 1. Tahiti.

Acanthurus humeralis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 231. Carolines, Tahiti.—Jenyns, Zool. Voy. Beagle, Fish., vol. 4, 1842, p. 76 (Tahiti).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1850, p. (740) 762 (Macassar); vol. 15, 1858, p. 200 (Goram); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 5, No. 8, 1858–59, p. 2 (Manado, Celebes).

Harpurus paroticus Lichtenstein, Descript. Animal., 1844, p. 183. Tahiti.

Depth 2⅒ to 2⅓; head 3½ to 3¾, width 1⅞ to 2. Snout 1¼ to 1⅓; eye 4⅖ to 4⅘, 3¼ to 3⅘ in snout, 1⅓ to 1⅗ in interorbital; teeth 18 to 20 in jaws, moderate; maxillary 3⅞ to 4⅖ in head; interorbital 3⅕ to 3⅓, convexly elevated; opercle, preopercle flange and humeral arch with distinct striae. Gill rakers 8+17, short flexible points.

Scales very small, ovoid, closely imbricated, with very minute circuli; apical denticles 7 to 10, with 5 to 7 transverse series basally, mostly as well developed cusps.

D. IX, 22, i to 24, i, last spine 2 to 2¼ in head, first ray 1⅘ to 2; A. III, 22, i or 23, i, third spine 2¼ to 3, first ray 2 to 2⅖; caudal deeply emarginate or lunate, points long and slender, extended, 2⅕ to 2⅓ in combined head and body; least depth of caudal peduncle 2⅗ to 2⅞ in head; pectoral 1 to 1⅒; ventral 1⅕; caudal spine 2⅞ to 3¼.

Largely uniform dusky brown. Iris deep brown. From opercle above orange band, at least wide as eye, horizontally back far as tip of depressed pectoral, and bordered all around with blackish band. Fins largely dusky, hind emargination of caudal with whitish border. Pectoral with hind border pale brownish.

Mauritius, East Indies, Riu Kiu, Queensland, Micronesia, Polynesia, Hawaii.

8456. Cebu market. March 28, 1909. Length 228 mm.

A1535. Doc Can Island. January 7, 1910. Length 230 mm.

A420. Jolo market. March 7, 1908. Length 273 mm.

72196 U.S.N.M. Cagayancillo. R. C. MacGregor. Length 120 mm.

71593 to 71595 U.S.N.M. Nafa, Okinawa. *Albatross* collection 1906. Length 222 to 230 mm.

52521 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Two examples, 68 to 127 mm.

51111 U.S.N.M. Hawaiian Islands. Bureau of Fisheries. Length 193 mm.

HEPATUS PYROFERUS (Kittlitz)

Acanthurus pyroferus Kittlitz, Mus. Senckenb., vol. 1, 1834, p. 193, pl. 12, fig. 2. Ulea Island, Carolines.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 337 (copied); Journ. Mus. Godeffroy, vol. 4, 1875, p. 113 (copied).

Acanthurus armiger Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 234. No locality [Carolines].

Acanthurus tennenti Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 337. Ceylon.

Acanthurus tennenti Day, Fishes of India, pt. 2, 1876, p. 204 (Ceylon); Fishes of India, Suppl., 1888, p. 788 (Akkaran); Fauna Brit. India, vol. 2, 1889, p. 140.

Depth 1⅞ to 2⅛; head 3¼ to 3⅖, width 2¼ to 2⅖. Snout 1¼ to 1⅓; eye 4¾ to 5⅞, 3⅖ to 4⅓ in snout, 1⅔ to 1⅞ in interorbital; teeth 18 to 20 in jaws, moderate; maxillary 4⅛ to 4⅔ in head; interorbital 3 to 3⅛; opercle, preopercle limb and humeral arch with radiating striae, rather fine, not prominent. Gill rakers 8 + 16, short, cuneate, fleshy, flexible.

Scales broadly ovoid, small, narrowly imbricated, circuli extremely fine and numerous; apical denticles 14 to 22, with 11 to 13 transverse series of basal elements more or less complete cusps.

D. IX, 27, I to 29, I, last spine 1⅘ to 2⅛ in head, nineteenth ray 1⅓ to 1⅔; A. III, 25, I to 27, I, third spine 2½ to 2⅗, nineteenth ray 1¼ to 1⅔; caudal deeply emarginate or lunate, end produced in long points with age, 2 to 3⅔ in combined head and body; least depth of caudal peduncle 2⅔ to 2¾ in head; pectoral 1 to 1⅒; ventral 1⅙ to 1⅓; caudal spine 2⅗ to 3⅓.

Body largely uniform chocolate brown. Usually large triangular darker area at upper humeral region, often only as angular and usually enclosing an area twice or extent of eye, sometimes rarely less than eye. Iris brownish. Edge of opercular membrane along gill opening often dusky narrowly. Iris brown. Dorsals and anals largely dusky brown, deeper than body, each sometimes show narrow pale blue-gray basal line and edges of fins brighter blue narrowly. Caudal largely dusky medially and behind, base whitish or pale gray and upper and lower edges of fins brownish. Pectoral dusky or brownish largely, terminally above with broad pale blotch, light brown. Ventral neutral dusky. Groove and edges of caudal spine blackish.

We think the specimens listed below are likely the *Acanthurus pyroferus* Kittlitz. According to Valenciennes the figure is 154 mm. long, snout rather pointed, color brown, caudal and anal blackish with yellow border to former and with yellow, vertical, shoulder patch. However none of our examples have the "caudal with a broad yellow posterior margin" as Günther translates. It is likely his *Acanthurus tennentii* is the same though the dorsal is given with 23 soft rays and the anal with 22, his specimen was a skin but 127 mm. long. It is also said to have the caudal with "a broad white margin."

8152. Alibijaban Island, Ragay Gulf, Luzon. March 9, 1909. Length 325 mm. Sides dark umber brown, fading to series of very narrow slaty stripes through center of scale rows, with yellowish or olive interspace somewhat greater than stripes; yellowish interspaces orange posteriorly and anteriorly obsolete. Top of head and interorbital with purplish shades, latter much striped with olivaceous. Breast with olive and purple undulating stripes, merging with blackish of abdominal regions. Lemon yellow tints about eye. Purplish horse-shoe behind upper angle of gill opening. Dorsals olive, fading greenish olive, edge bright purple and purple stripe along base; hind rays purplish and a few bars of dusky or bluish near posterior margin. Anal blackish, with purple border and well defined dusky orange bars 5 or 6 across terminal third of fin. Caudal olivaceous, purplish in fork, base white and edges of lobes black. Pectoral dusky lemon yellow, upper rays yellow terminally. Ventral blackish. Caudal spine with black socket.

8716. Batan Island. June 5, 1909. Length 250 mm.

8955. Between Paron and Jesus Points, Luzon. June 21, 1909. Length 273 mm.

8369. Malapascua Island. March 16, 1909. Length 405 mm. Body purplish brown, fading greenish anteriorly above, raw umber medially and nearly orange posteriorly, with undulating slate blue stripes on scale rows. Side of head and breast nearly covered by bright purple stripes, interspaces somewhat olivaceous. Large purplish shade in horse-shoe from just above corner of gill opening downward to midway between point of opercle and pectoral base; enclosed area very dark olive, becomes black after death. Interorbital purple slate. Opercular flap black. Dorsals and anals broadly margined purple, without cross bars except terminally 2 or 3 obscurely; body of fins darker than side of trunk, purplish band at dorsal and anal bases. Caudal olivaceous, probably whitish in life, color clearly contrasted from caudal peduncle at base of fin; margin within fork purple. Pectoral rays purple basally, olive yellow terminally, membranes more or less hyaline. Ventral blackish olive, front and edge purplish. Caudal spine with black socket.

6261, 6262. Medio Island, Galera Bay, Mindanao. June 9, 1908. Length 325 to 384 mm.

8197. Port Busin, Burias Island. March 8, 1909. Length 233 mm.

A1234. Gomomo Island. December 3, 1909. Length 383 mm.

A1081, A1082. Maitara Island. November 26, 1909. Length 290 to 393 mm.

A998, A999, A1035. Buka Buka Island, Celebes. November 20, 1909. Length 285 to 293 mm.

HEPATUS NIGRICANS (Linnaeus)

Chaetodon nigricans LINNAEUS, Syst. Nat., ed. 10, vol. 1, 1758, p. 274. Red Sea; Syst. Nat., ed. 12, vol. 1, 1766, p. 462.—BLOCH, Naturg. Ausl. Fische, vol. 3, 1787, p. 82 (not plate, part).—GMELIN, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1245 (Red Sea).

Chaetodon nigricans Bonnaterre, Tabl. Ichth., 1789, p. 83, pl. 45, fig. 171 (Red Sea).

Harpurus nigricans Forster, Fauna Indica, 1795, p. 15.

Acanthus nigricanus Suckow, Naturg., vol. 4, 1799, p. 375.

Acanthurus gahm Rüppell, Atlas Reise Nordl. Afrika, Fische, 1828, p. 58 (Djedda, Massauah).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 219 (Red Sea, Mauritius).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 338 (copied).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 506 (Red Sea).—Günther, Journ. Mus. Godeffroy, vol. 4, 1874, p. 113, pl. 74 (Society Islands, Paumotu, Samoa, Hervey Islands, Kingsmills, Gilbert Islands).—Day, Fishes of India, Suppl., 1888, p. 789; Fauna Brit. India, vol. 2, 1889, p. 141.—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 338.—Steindacher, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 426 (Ternate).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 318 (Saleyer).—Pellegrin, Bull. Soc. Zool. France, vol. 39, p. 227 (Diégo Suarez, Madagascar).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 411, pl. 12, fig. 2 (Tablas, Bantayan, Samal, Basbas, Bungau, Clarendon Bay).

Acanthurus gahhm Rüppell, Neue Wirbelthiere, Fische, 1835, p. 131 (Red Sea).—Bleeker, Act. Soc. Sci. Ind. Néerland., vol. 3. No. 4, 1857-58, pp. 3, 8; No. 5, 1857-58, p. 2 (Macassar).

Acanthurus (*Rhombotides*) *gahm* Klunzinger, Fische Roth. Meer., 1884, p. 84.

Acanthurus gahmoides Guichenot, Notes I. Réunion, vol. 2, 1862, p. 6 (25). Reunion.

Depth 1$\frac{9}{10}$ to 2; head 3⅓ to 3¾, width 1⅞ to 1⅘. Snout 1⅓; eye 3⅔ to 4, 2¾ to 3⅗ in snout, 1¼ to 1½ in interorbital; teeth 16 to 18 in each jaw; maxillary 4 to 4½ in head; interorbital 2⅞ to 3⅕, convex. Gill rakers 7 + 14, short, feeble points.

Scales with minute circuli; apical denticles 11 to 14, with 2 or 3 series of transverse basal elements.

D. IX, 24 to 28, ninth spine 1⅘ to 2 in head, fourteenth ray 1⅘ to 1⅞; A. III, 26 or 27, third spine 2⅕ to 2¼, first ray 1⅔ to 1⅘; caudal deeply lunate, with long slender points, 2⅙ to 2⅖ in combined head and body; least depth of caudal peduncle 2⅘ to 3 in head; pectoral 1; ventral 2⅞ to 3.

Chocolate brown generally. Eyes dusky brown. Blackish postocular bar extends short distance behind shoulder. Groove of caudal spine blackish, with black streak extending forward on side of tail, for several times length of spine at least. Fins all deep brown, with dusky tinge. Hind caudal edge narrowly whitish. Hind pectoral edge rather broadly whitish or pale. Some examples, especially small ones, show pale gray base.

Red sea, Mauritius, India, East Indies, Melanesia, Micronesia, Polynesia, Hawaii.

19150. Batan Island. June 5, 1909. Length 210 mm.

8709. Batan Island and Rapu Rapu Island. June 5, 1909.

15492 to 15494. Butauanan Island. June 15, 1909. Length 185 to 242 mm.

8557, 8558. Bolinao. May 10, 1909. Length 257 to 294 mm.

11633, 11634, 12458. Bugsuk Island, Balabac. January 5, 1909. Length 120 to 225 mm.

8058. Busin Harbor. April 22, 1908. Length 270 mm.

9145. Cabugan, Chico Island. July 30, 1909. Length 338 mm.

9344, 9345. Cagayan, Sulu Island. January 8, 1909. Length 125 to 213 mm.

7796, 9448. Candaraman Island, Balabac. January 4, 1909. Length 223 to 295 mm.

8027. Capulaan Bay, Pagbilao Island, Luzon. February 24, 1909. Length 258 mm. Dorsal and anal edges narrowly bright blue. Fork of caudal whitish. Pectoral tip yellow.

8274. Canmahala Bay, Luzon. February 24, 1909. Length 258 mm.

7749, 12254. Caxisigan Island. January 2, 1909. Length 260 to 290 mm.

12663. Cebu market. April 4, 1908. Length 143 mm.

8921. Atulayan Island, Luzon Gulf. June 18, 1909. Length 326 mm.

8861. Daet Point. June 14, 1909. Length 303 mm.

222, 7591 to 7593, 12482. Endeavor Strait. December 23 and 24, 1908. Length 190 to 233 mm.

8253. Galvaney Island, Ragay Gulf. March 9, 1909. Two examples. Length 247 to 267 mm.

11865. Gubat, Luzon. June 23, 1909. Length 170 mm.

8426. Tilig, Lubang Island. July 4, 1908. Length 175 mm.

9826. Little Santa Cruz Island, Zamboanga. May 26, 1908. Length 207 mm.

8312. Lode Bay, Destacado Island. May 13, 1909. Length 280 mm.

5411. Mactan reef, Mactan Island. April 6, 1908. Length 178 mm. Seal brown. Black stripe on postorbital across shoulder. Iris silvery, orange below. Dorsal and anal with narrow blue edges on black, vertical fins body color. Caudal fork with white. Pectoral tip sulphur yellow.

8815. Maculabo Island. June 13, 1909. Length 343 mm.

8362. Malapascua Island. March 16, 1909. Two examples. Length 243 to 280 mm. Long black shoulder mark and caudal spine with black socket. White on purple in caudal fork. Body not distinctly striped. Pectoral with terminal third yellow.

12024. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 220 mm.

6165. Mansalay, Mindoro. June 4, 1908. Length 270 mm. Black shoulder stripe present. Dorsal dark umber, fades to sulphur yellow. Dorsal and anal margined bright blue. White crescent in margin of caudal fork. Pectoral with yellow.

7246. Masinloc Bay, Zambales. November 23, 1908. Length 243 mm. Cuneate bar of dark brownish purple, not quite length of pectoral behind eye and slightly oblique across shoulder. Tapering stripe of brownish purple forward from base of caudal spine. Dorsal yellowish brown, narrow blue edge little broader and more brilliant posteriorly. Caudal with bright blue margin and dark purple basal line; interior with bluish-white band tapering away at points of fin and band preceded basally by narrow purple line. White bar on caudal peduncle obsolete. Pectoral tip hyaline, yellow band basally. Front ventral edge ⅔ its length bluish.

8055, 8058. Mompog Island. March 3, 1909. Length 260 to 275 mm.

6615, 6616. Northwest Point, Verde Island. July 22, 1908. Length 270 to 303 mm.

12797. Opol, Mindanao. August 4, 1909. Length 142 mm.

7947. Pagapas Bay, Luzon. February 20, 1909. Length 195 to 240 mm.

8737. Port Agojo, Catanduanes Island. June 10, 1909. Length 260 mm.

8002. Port Banalacan, Marinduque. February 23, 1909. Length 300 mm. Chocolate brown generally. Shoulder mark deep blue-black. Streak before caudal spine deep black. Edges of dorsal and anal bright blue and narrow red line at dorsal base. Margin of caudal crescent white, with tinge of blue at base of white edge. Pectoral mostly body color, posterior edge hyaline with yellow submargin. Ventral body color, paler at inner edge.

6575. Port Maricaban, Island reef. July 21, 1908. Length 320 mm. Shoulder black and caudal spine with black stripe. Dorsal with orange and anal somewhat similar.

7260. Port Matalvi, Luzon. November 23, 1908. Length 267 mm. Black shoulder stripe. Dorsal and anal with blue edges. Margin of caudal fork white. Pectoral tips yellow.

8974. Rapu Rapu Island and Strait. June 22, 1909. Length 300 mm.

7308, 7309. Sablayan, Mindoro. December 12, 1908. Length 235 to 295 mm. Black shoulder mark present. Dorsal and anal narrowly edged blue. Caudal white in fork. Pectoral with yellow near tip.

4991, 4992. Sanguisiapo Island. February 24, 1908. Length 180 to 256 mm. Smoky black. Jet black postocular bar across shoulder about half length of pectoral. Dorsal smoky yellow, narrowly margined blue on black line. Anal smoky black, margined like dorsal. Caudal smoky, fork edged white and with submarginal bluish shades. In life white bar across caudal peduncle at caudal base, becomes obscured after death. Pectoral dusky black, edge lemon yellow and hyaline. Caudal spine smoky, black line forward from socket nearly length of pectoral.

5003. Simonor Island. February 24, 1908. Length 305 mm.

5035. Sitanki Wharf. February 27, 1908. Length 265 mm.

5713, 5714. Surigao, Mindanao. May 8, 1908. Length 295 to 303 mm.

12700. Tara Island. December 14, 1908. Length 150 mm.

7369. Tara Island. December 15, 1908. Length 280 mm.

5827. Tataidaga Point. May 15, 1908. Length 212 mm.

12070. Tictuan Island. September 8, 1909. Length 225 mm.

7695. Ulugan Bay. December 29, 1908. Length 278 mm.

6663. Varadero Bay, Mindoro. July 23, 1908. Length 290 mm.

6643. Varadero Bay. July 23, 1908. Length 220 mm.

7139, 7172, 7173. West coast of Palaui Island. November 18, 1908. Length 260 to 300 mm. Black shoulder bar present. Dorsal edge very narrowly bluish, anal more so. Caudal tips white and white bar at base obscure. Pectoral tips yellow.

6928. West coast of Sabtan Island. November 8, 1908. Length 290 mm.

A977. Binang Unang Island. November 17, 1909. Length 343 mm.

A927. Dodepo Island, Celebes. November 16, 1909. Length 344 mm. Generally slaty, with dark brown stripes on side posteriorly, much wider than interspaces and somewhat breaking into spots on back immediately below dorsal fins. Side of head, front of breast and body anteriorly above pectoral base with brown spots hexagonal; on hind breast and belly spots obsolete. Upon fading and in alcohol spots disappear. Dorsal like body, crossed by oblique bars anteriorly and posteriorly, turning and horizontal or parallel to outer fin edge on soft fin terminally. Anal similar, and in both fin markings little distinct except by transmitted light. Caudal uniform, very dark brown, almost blackish. Pectoral rays dark brown, hyaline at tips, also membranes. Ventral like pectoral.

A1435. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 273 mm.

A865. Limbe Strait, Celebes. November 10, 1909. Length 253 mm.

A1583. Soo Wan, eastern Formosa. January 29, 1910. Length 250 mm.
30543 U.S.N.M. New Guinea. Australian Museum. Length 223 mm.
52496 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 117 to 260 mm. Three examples.
66054 U.S.N.M. Suva, Fiji. *Albatross* collection. Length 130 mm.

HEPATUS NIGROFUSCUS (Forskål)

Chaetodon nigrofuscus Forskål, Descript. Animal, 1775, pp. xiii, 64. Djedda, Red Sea.—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1268 (on Forskål).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 438 (on Forskål).

Acanthurus nigro-fuscus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 214 (Bourbon Island, Red Sea).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 331 (Ceylon, Amboina).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 27.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (Manado, Celebes; Siao, Sangi).—Boulenger, Proc. Zool. Soc. London, 1887, p. 660 (Muscat).—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 338.—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 12 (Oman).

Acanthurus (*Rhombotides*) *nigrofuscus* Klunzinger, Fische Roth. Meer., 1884, p. 84.

Teuthis nigrofuscus Ogilby, Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 23 (Dunk Island).

Acanthurus rasi Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 203. Pondichery.—Bleeker, Verh. Bat. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48.

Acanthurus niger (Ehrenberg) Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 58. Red Sea (nomen nudum).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 174 (name in text).

Acanthurus rubropunctatus Rüppell, Atlas Reise Nördl. Afrika, Fische, 1828, p. 59, pl. 15, fig. 1. Northern part of Red Sea.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 333 (copied).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 508 (Red Sea).

Acanthurus matoides (not Valenciennes) Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 507 (types of *Acanthurus nigrofuscus* Valenciennes).

Acanthurus güntheri (not Jenkins) Weber, Siboga Exp., vol. 57, Fische, 1913, p. 317. Amboina. (On Günther 1861.)

Hepatus weberi Ahl, Mitt. Zool. Mus. Berlin, vol. 11, 1924, p. 37 (on Weber 1913).

Depth 1⅘ to 2; head 3⅓ to 3½, width 1⅞ to 2⅕. Snout 1⅓ to 1½; eye 3⅖ to 4¾, 2¼ to 3½ in snout, 1¼ to 1⅔ in interorbital; teeth 18 to 20 in each jaw; maxillary 3⅞ to 4¼ in head; interorbital 3 to 3⅕, convex. Gill rakers 8 + 17, short, feeble points.

Scales with minute circuli; apical denticles 18 to 20, with 4 to 6 series of transverse basal elements.

D. IX, 28, ninth spine 1½ to 1⅔ in head, fourteenth ray 1¼ to 1½; A. III, 25 to 27, third spine 2 to 2⅛, first ray 1⅔ to 1¾; caudal deeply lunate, with long, slender points, 2⅓ to 2⅖ in combined head and body; least depth of caudal peduncle 2⅗ to 2¾ in head; pectoral 1; ventral 1⅛ to 1¼; caudal spine 3⅕ to 3⅘.

Deep chocolate brown generally. Iris dusky brown. Dorsals and anals dusky, especially basally. Caudal abruptly pale gray to whitish basally, fin medially towards edge dusky or blackish-brown and above and below terminally with more or less brownish. Pectoral brownish, uniform, without pale edge. Ventral deep dusky. Caudal spine brown, edge of groove blackish all around.

Red Sea, Mauritius and Rodriguez to India, East Indies, Philippines, Riu Kiu, Japan, Queensland.

Some examples show the chin pale or even whitish, especially young examples. In others the pectoral may be more or less uniform brownish. It is in the pale caudal base that the greatest variation is seen, the transverse whitish band appearing variously distinct or obscure. With age, a black blotch, above both opercle and gill opening, its vertical diameter not greater than pupil and its horizontal diameter may be long as eye. Also large examples show the entire sides of the head and predorsal region finely dotted or spotted with gray white, spots much smaller above postocular region. Such examples may also have the hind caudal edge very narrowly whitish. In our entire series the paired fins are entirely uniform deep dusky to brownish.

This species may be known by its combination of colors, the white band at the caudal base, the uniform dark paired fins, the edge of soft dorsal and anal narrowly bluish and the dusky postocular blotch, the latter not only on the opercle but also on the suprahumeral region. Klunzinger (1884) discusses the fin rays, giving but 24 or 25 for the dorsal and the anal with 23 or 24.

8923 to 8927, 8929. Atulayan Island, Lagonoy Gulf, Luzon. June 18, 1909. Length 245 to 283 mm. Dark brown, sometimes with slate; on fading side shows narrow brown lines with blue-white interspaces as in *Ctenochaetus strigosus*. Breast from pectoral base downward washed orange brown. Caudal spine with bright orange socket. Orange blotch before and behind pupil. Dull obscure orange stripe from eye through nostrils across frontal region. No shoulder blotch. Dorsal slate-gray or almost black basally, and in alcohol few narrow bars appear on hind terminal portion. Anal like dorsal, without dark base and edge narrowly bright blue. Caudal slate, without white tip but white band across base. Pectoral slate, tips somewhat olive yellow. Ventral slate, with slight yellowish dash at tips of last rays.

19374. Beach near Caiholo River, Ulugan Bay, Palawan Island. December 29, 1908. Length 48 mm.

8956. Between Paron Point and Jesus Point. June 21, 1909. Length 217 mm.

8035 [1170]. Capulaan Bay, Pagbilao Island, Luzon. February 24, 1909. Length 225 mm. Body with alternate brown and paler longitudinal lines. Black area about breadth of pupil, somewhat longer than wide, below upper angle of gill opening. Anal with narrow bright blue border.

18364. Cebu market. April 4, 1908. Length 87 mm.

21819. Cebu market. March 22, 1909. Length 50 mm.

[1856]. Cebu market. August 23, 1909. Length 58 mm.

Three examples Cebu market. August 27, 1909. Length 40 to 55 mm.

8229. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 248 mm. Apparently without stripes and possibly with very minute lines, one on each row of scales. No white chin stripe. No yellow through eye. Very small dusky band below and behind lower angle of gill opening. Caudal spine with orange socket. Vertical fins darker than body, dorsal with apparent slate edge. Anal blue below over black line. Caudal dark without white edge and with short dark bar across upper portion of base. Paired fins dark, no yellow on pectorals.

9252, 9259. Inamucan Bay, Mindanao. August 8, 1909. Length 220 to 280 mm. Generally deep dusky. Longitudinal lines obscure. Very small black blotch behind upper angle of gill opening. Head and breast uniform brown, without spots. Dorsal with 1 or 2 dusky bars, most distinct on hind portion, with very narrow blue edge. Anal edge blue and submarginal band black, also 1 or 2 other dusky bands. Caudal with white band. Pectorals slightly olive terminally, not yellow.

11912. Jolo market. February 11, 1908. Length 147 mm.

A480, A484. Lampinigan Island. September 11, 1909. Length 230 to 250 mm. Dusky dash across upper angle of gill opening. Caudal spine with more or less orange socket and orange band across caudal peduncle more distinct. Dorsal edge black, anal edge blue, each fin with few dark bars terminally on posterior portions. Pectoral without yellow.

7467. Maculabo Island. June 14, 1909. Length 195 mm.

9204, 9205. Mahinog, Camiguin Island. August 3, 1909. Length 211 to 280 mm.

6791. Malanipa Island. September 8, 1908. Length 248 mm. Brown, with very small dark dash across upper angle of gill opening, narrower than pupil. Caudal spine with orange socket. Dorsal with 1 or 2 dusky bars posteriorly, anal with 2 or 3, each fin with narrow purple edges. White band wide as pupil, contrasted, at caudal base.

8363. Malapascua Island. March 16, 1909. Two examples, both 265 mm. Very small dark blotch at upper angle of gill opening. Caudal spine with orange socket. Body striped. Both with white band at caudal base, not white in fork. Pectoral olive yellow at tip.

6167. Mansalay, Mindoro. June 4, 1908. Length 290 mm. No trace of black shoulder mark. More or less orange below caudal spine. Dorsal and anal edged blue. Caudal with very narrow pale edge behind. Pectoral edge yellow.

6168 to 6171, 8882, 20849. Mansalay. June 4, 1908. Length 55 to 242 mm. No black shoulder mark. Anal edge blue. Pale bar at caudal base. Pectoral sometimes yellowish terminally. White bar on caudal.

16619. Maribojoc Bay, Bohol Island. March 26, 1909. Length 206 mm.

8056, 8057. Mompog Island. March 3, 1909. Length 275 to 278 mm.

6243, 6244. Medio Island, Galera Bay. June 9, 1908. Length 248 to 260 mm.

9356. Murcielagos Bay, Mindoro. August 20, 1909. Length 300 mm.

Two examples. Pandanon Island. March 23, 1909. Length 30 mm.

8751. Parangpong Island. June 10, 1909. Length 335 mm.

8736. Point Agojo, Catanduanes Island. June 10, 1909. Length 305 mm.

One example. Port Galera. June 9, 1908. Length 32 mm.

10488 to 10490, 10732, 11016, 18965, 18966. Port Maricaban. July 21, 1908. Length 194 to 240 mm.

13473. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 80 mm.

22439, 22440. Pucot River, Mariveles. January 29, 1909. Length 67 to 73 mm.

8780. Quinalasag Island. June 12, 1909. Length 290 mm.

8980, 8981. Rapu Rapu Island. June 22, 1909. Length 217 to 290 mm. Brown, with orange shades on breast and tail. Caudal spine with orange socket. Head without stripes or spots. Dusky blotch on shoulder about size of pupil. Dorsal and anal without bars, anal edge blue, dorsal edge apparently not blue. Caudal without white in fork but with white bar at base of fin. Pectoral without yellow.

19826, 19827. Romblon. March 26, 1908. Length 83 to 102 mm.

One example. San Pascual, Burias Island, in tide pool. March 8, 1909. Length 50 mm.

A556. Sulade Island. September 18, 1909. Length 278 mm. Side of body brown, darker stripes longitudinally. Side of head without markings. Black oblong blotch behind gill opening. Caudal spine with orange socket. One or two obscure bars near edge of dorsal and anal, most distinct posteriorly; anal with distinct purple edge, dorsal similar but very much narrower. Caudal with distinct white basal bar.

A558. Sulade Island. September 17, 1909. Length 310 mm.

8345. Talajit Island, Buang Bay. March 15, 1909. Length 310 mm. Body very finely striped with purplish blue and olive. Front and side of head brown becoming blackish on vertical flap. Very short dark blotch behind upper angle of gill opening. Breast mostly dusky, also with orange shades. Fins dull violaceous, dorsal edge somewhat purplish with submarginal translucent bar; anal margin bright purple. White band across caudal base. Caudal spine with orange socket. Paired fins olive or black, without marks or color variation.

8531. Verde del Sur Island. April 6, 1909. Length 220 mm.

A726, A727. Danawan Island. September 27, 1909. Length 240 to 282 mm.

A1232, A1233. Gomomo Island. December 3, 1909. Length 255 to 290 mm.

A1506, A1507. Birabirahan Island, Borneo. December 31, 1909. Length 262 to 265 mm.

A981, A982. Binang Unang Island. November 17, 1909. Length 257 to 267 mm.

A1375, A1376. Basa Island, Gulf of Boni, Celebes. December 17, 1909. Length 240 to 250 mm. Small blackish blotch behind upper angle of gill opening, rapidly fading away. Somewhat yellowish wash on breast below pectoral. Caudal spine with somewhat orange socket. Dorsal blackish along edge, few obscure darker bars posterior and terminal on soft fin, 1 distinct along entire margin. Anal with bright blue border. Caudal with white basal band, not encroaching on fin except on upper rays. Pectoral with general olive yellow shade terminally.

A1031. Buka Buka Island, Celebes. November 20, 1909. Length 277 mm.

A1488. Libani Bay, Kait Point, Celebes. December 29, 1909. Length 208 mm. Body stripes fine. Black shoulder blotch larger than pupil. Dorsal and anal obscurely barred terminally. Anal margin bright blue. Caudal with white basal band. Pectoral without yellow.

HEPATUS MACULICEPS Ahl

Hepatus maculiceps Ahl, Mitth. Zool. Mus. Berlin, vol. 11, Heft 1, 1924, p. 36, fig. 4. Talassia, New Pomerania.

Depth 1¾ to 2; head 3¼ to 3⅓, width 2 to 2⅛. Snout 1⅕ to 1¼; eye 4 to 5, 3⅕ to 3¾ in snout, 1⅓ to 1⅘ in interorbital; 16 to 18 teeth in each jaw; maxillary 3½ to 3⅔ in head; interorbital 2⅞ to 3, convexly elevated; opercle, preopercle flange and humeral arch feebly striate. Gill rakers 6 + 13, short points.

Scales ovoid, very small, with fine, close-set circuli; apical denticles 8 to 14, with 9 or 10 transverse series of basal cusps.

D. IX, 23, i to 24, i, ninth spine 1⅘ to 2, first ray 1¾ to 1⅘; A. III, 22, i or 23, i, third spine 2⅖ to 2½, first ray 2 to 2⅒; caudal deeply emarginate or lunate, with ends elongated points, 2 to 2⅔ in combined head and body; least depth of caudal peduncle 2⅓ to 2½ in head; pectoral 1; ventral 1⅕ to 1⅖.

Largely uniform chocolate brown, the trunk and tail with exceedingly fine, slightly waved longitudinal parallel lines. Head marked with thickset small round spots all greatly less than pupil and grayish in color, variably more numerous and close-set with age. Elongate black blotch about equals pupil width and its length 1½ eye diameters, horizontal in position. Groove of caudal spine dusky or blackish. Fins all more or less deep brown to dusky, dorsals and anals both with 6 to 9 longitudinal darker parallel bands, which often obscure or absent in preserved examples. Caudal deep or dusky brown, often with transverse pale gray to whitish basal band, often absent with age, when fin appears uniform dusky. Pectoral deep or dusky brown, with terminal third formed largely or entirely as pale or yellowish-brown blotch. Ventral neutral-dusky.

East Indies, Philippines, Melanesia.

This species belongs with those we identify as *Hepatus nigrofuscus*, *Hepatus grammoptilus* and *Hepatus bariene* in the pearly or whitish transverse caudal band. Otherwise it differs from all in the combination of color-design descibed above. Especially characteristic is the elongated horizontal humeral blackish blotch and the pale end to the pectoral fins. Ahl's figure is a fair outline of the species, though it is of such poor texture that it fails to show the greatly contrasted color pattern seen in most specimens.

8922. Atulayan Island, Lagonoy Gulf, Luzon. June 18, 1909. Length 340 mm. General color slaty or brown, resolving on fading into narrow slaty lines divided by narrower yellow interspaces; these yellow dividing lines become obsolete on breast and side below pectoral. Head dark brown or fading to slate gray, side and nape covered with small, round, pale, yellowish-white spots, about ¼ of pupil and probably bright yellow at times. Dark blotch behind angle of gill opening, little longer than eye diameter and about half wide as long, placed back from gill opening space equal to pupil. From forward end to eye yellow stripe which appears as fish fades. Forward part of breast washed with olive yellow, less distinctly on rest of breast. Caudal spine with black socket. Purplish stripe on dorsal base on fading, fin with alternate slaty or yellow ocher bars—8 or 9—of yellow. Fins dusky olive at margin, probably wholly so in life. Anal similar, but bars less pronounced and of smaller width. Caudal plain slaty, very narrowly tipped with white in fork and lemon yellow or whitish bar at caudal base, wider above where about ⅔ diameter of eye. Pectoral slaty, bright yellow blotch on terminal third of second to sixth or seventh rays. Ventral slaty, becomes yellowish at tips.

8862. Daet Point. June 15, 1909. Length 215 mm.

7044. Port San Piò Quinto, Camiguin Island. November 11, 1908. Length 263 mm. General color brownish, lines on body distinct. Oblong seal brown shoulder spot, yellowish anteriorly at angle of gill opening. Distinct whitish bar across tip of caudal peduncle. Head with numerous pale spots. Dorsal and anal with alternate slaty and yellowish bars. Terminal upper half of pectoral yellow.

8984. Rapu Rapu Island and Strait. June 22, 1909. Length 255 mm. Brown with longitudinal pale lines. Head with pale spots. Oblong blotch on shoulder twice as wide as long, width about equals pupil. Dorsal and anal apparently without blue edges, fins with many dark bars, about 8 on dorsal. Caudal narrowly white at tip and in fork, white bar at base of fin. Pectoral yellow at upper tip.

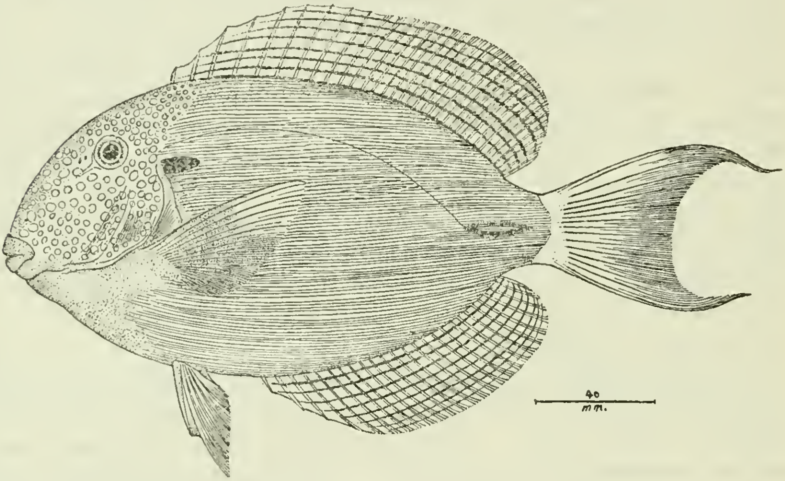

FIG. 13.—HEPATUS MACULICEPS AHL

6897, 6898. Santo Domingo, Batan Island. November 7, 1908. Length 300 to 318 mm. Umber, with numerous narrow, slaty blue stripes; body becomes yellowish on fading. Side of head with more or less obscure, hexagonal, paler spots, size of number 8 shot. Dorsal barred alternately with yellowish umber and slaty, stripes about ¼ eye diameter. Similar, but very much obscured stripes on anal and fin edge narrowly blue. Inside of caudal fork narrowly white-edged. Pectoral with bright yellow spot on terminal third of second to sixth rays.

6929, 6965, 6971. West coast of Sabtan Island. November 8, 1908. Length 278 to 335 mm. Black shoulder mark distinct. Alternate yellowish and darker stripes distinct on body but pale ones very narrow. Side of head and nape with dark spots which fade to paler than ground color. Distinct yellowish-white bar across caudal peduncle at caudal base. Dorsal and anal barred. Pectoral with yellow on upper tip.

A1083. Maitara Island. November 26, 1909. Length 322 mm.

A1508. Birabirahan Island, Borneo. December 31, 1909. Length 320 mm.

A978 to A980. Binang Unang Island. November 17, 1909. Length 260 to 305 mm. Deep dusky on side of body, narrow lines of blue slate, broader dark brown lines fading olive. Dash of black behind upper angle of gill opening, elliptical, somewhat narrower than pupil, longer than orbit. Throat and breast slaty lavender fading to olive. Side of head brownish, with numerous rather regularly disposed paler spots about size of number 6 or 8 shot. Dorsal alternately banded with olive brown and slate, bars of about equal width and somewhat anastomosing, slightly less in width than third of pupil; edge of fin dark. Anal similar, bands much less distinct and edge bluish. Caudal with distinct bands, quite dark, tip within fork very narrowly white. Pectoral slaty, membranes hyaline near tips of lower rays, tip of upper half of fin sulphur yellow. Ventrals fade olive terminally.

A1434, A1476. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 312 to 352 mm.

(A1434) with fine lines on body. Side of head with spots. Well-defined shoulder blotch about three times long as wide. Dorsal brown, with about 9 slaty bars equal to interspaces, margin not distinctly blue. Anal without distinct bars, edge blue. Caudal with very narrow white edge in fork. Pectoral bright yellow in upper half of tip.

(A1476.) Shoulder blotch more or less pointed behind, slightly outlined with pale after fading. Dorsal stripes less distinct than A1434 and anal stripes like those on dorsal. Caudal when faded more or less marked with pale purplish, band at caudal base doubtless white in life, shows sulphur under green slate general coloration.

HEPATUS ATERRIMUS (Günther)

Acanthurus aterrimus Günther, Proc. Zool. Soc. London, 1871, p. 660. Savay, Samoan Islands; Journ. Mus Godeffroy, vol. 4, 1875, p. 114, pl. 77, fig. B (type).

A small species with depth about 1⅗, dark brown, with chin bar, opercle edge and hind caudal edge white. Günther's example was 89 mm. long.

HEPATUS LEUCOSTERNON (Bennett)

Acanthurus leucosternon Bennett, Proc. Comm. Zool. Soc. London, 1832, p. 183. Ceylon.—Bleeker, Nat. Tijds. Nederland. Indië, vol. 12, 1856, p. (230) 273 (Batu Island).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 340 (type).—Valenciennes, Règne Animal, Cuvier, Ill., Poiss., 1839, pl. 71, fig. 1 (Moluccas).

Acanthurus delisiani Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 193. Mauritius.—Bleeker, Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48.

Acanthurus delissianus Guérin, Iconogr. Poiss., vol. 3, 1844, p. 22 (Mauritius).

Acanthurus delisianus Guérin, Iconogr. Poiss., vol. 3, 1844, pl. 35, fig. 2.

Acanthurus celebicus Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. (740) 761. Macassar; vol. 10, 1856, p. 360 (Ternate).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 339 (copied).—Kner, Reise Novara, Fische, 1865, p. 211 (Madras).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 115, pl. 73, fig. B (Celebes, Ternate, Solomon Islands, Tahiti).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 417, pl. 13, fig. 1 (Calapan).

Hepatus celebicus Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 30 (Manila).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 97 (Bulan).—Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).

Acanthurus fuscus Steindachner, Verh. zool. bot. Ges. Wien, vol. 2, 1861, p. 176, fig. 2. Amboina.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 339 (copied).

Depth 1⅘ to 2; head 3⅗ to 3⅔, width 1⅞ to 2. Snout 1⅓ to 1⅖; eye 3⅔ to 4⅛, 2⅘ to 3 in snout, 1⅕ to 1¼ in interorbital; teeth 14 to 18 in each jaw; maxillary 4 to 4⅕ in head; interorbital 3 to 3⅛, broadly convex; few oblique grooves on opercle and preopercle flange. Gill rakers 9 + 12, short, feeble, cuneate points.

Scales large, narrowly imbricate, with minute circuli; apical denticles 37 to 49, with 5 or 6 series transversely of low basal cusps.

D. IX, 28 or 29, ninth spine 1⅗ to 1⅔ in head, fifth ray 1¼ to 1⅓; A. III, 26 or 27, third spine 1⅞ to 2, fifth ray 1⅖ to 1½; caudal deeply lunate, with long slender attenuated points, 1¾ to 2½ in combined head and body; least depth of caudal peduncle 2⅕ to 2¼ in head; pectoral 3 to 3⅛ in combined head and body; ventral 1 to 1⅒ in head; caudal spine 3⅛ to 5¼.

Chocolate to umber brown generally. Iris deep brown. Edge of gill opening blackish-brown broadly, extension down across lower chin. Lips dusky, and lower with rather broad creamy crescent. Nostril in a small pale or creamy spot. Hind caudal edge narrowly pale or grayish-white. Pectoral more or less gray-brown over greater terminal area, dark or dusky basally. Fins otherwise largely dusky brown. Caudal spine usually with narrow dusky margin to groove.

The species is known by the blackish band around the gill opening, besides the pale crescent across the chin.

Mauritius, Ceylon, East Indies, Philippines, Riukiu, Melanesia, Polynesia.

Günther describes Bennett's type as blue, head black, chest and ring encircling lower part of mouth white, caudal with 2 black crescents of which one across base and the other marginal and both united by upper and lower edges of fin. There is little doubt but that it applies to *Acanthurus celebicus* Bleeker which has a similar pattern of coloration. As Günther thought *Acanthurus fuscus* Steindachner is another synonym, evidently the adult.

1232, 8962. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 222 to 238 mm. Orange brown appears bright orange under deciduous scales when latter removed. Head without orange shades. Small black blotch at upper angle of gill opening, equally on opercle and shoulder. Caudal spine with black socket. White band under chin and across end of maxillary. Dorsal and anal slate black, orange under scaling. Caudal similar but paler, produced upper lobe and margin of fork bright cadmium orange. Pectoral black basally, orange terminally. Ventral with obscure spots, seen by transmitted light.

19259. Busbus Point, Siasi Island. September 20, 1909. Length 164 mm.

10965. Cagayanes Island. March 31, 1909. Length 187 mm.

15444. Calangaman Island. March 16, 1909. Length 215 mm.

9239. Camp Overton, Mindanao. August 6, 1909. Length 235 mm.

5384, 12837. Cebu market. April 6, 1908. Length 183 to 228 mm.

15846. Dupon Port, Leyte Island. March 17, 1909. Length 220 mm.

17154. Malapascua Island. March 16, 1909. Length 205 mm.

7288. Paluan Bay, Mindoro. December 11, 1908. Length 203 mm.

11131. Pasacao, Ragay Gulf, Luzon. November 9, 1909. Length 173 mm.

10769 [1162], 10768, 22634, 22635. Port Banalacan, Marinduque. February 23, 1909. Length 175 to 225 mm. General color of body and fins black. Dirty whitish stripe under chin till over maxillary, but not crossing snout. Small dirty-white spot on lower line of pectoral, base of fin blackish, outer half orange. Rich orange margin in crescent of caudal.

12649. Port Palapag. June 3, 1909. Length 158 mm.

219, 15646. Rapu Rapu Island. June 22, 1909. Length 190 to 195 mm.

11264. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 212 mm.

A638. Simaluc Island. September 22, 1909. Length 225 mm.

A472. Tulnalutan Island. September 9, 1909. Length 232 mm.

7137, 7138, 7175. West coast of Palaui Island. November 18, 1908. Length 220 to 243 mm. Scarlet shades anteriorly below. Very dark area across opercle and somewhat above at angle, left on fading. Terminal half of pectoral and caudal tip orange.

6964. West coast of Sabtan Island. November 8, 1908. Length 220 mm. Black, fading on sides and anteriorly to orange, above pectoral base scarlet. Black persistent as blotch behind upper angle of gill opening. Slight orange shades through and between eyes. White band from tip of maxillary across chin. White blotch on iris below. Preopercle edge showing as blackish bar on faded fish and another bar somewhat in front, from behind eye across cheek. Vertical fins black, except orange tips and margin of caudal. Pectoral black basally, orange on terminal half or $\frac{3}{5}$. Ventral black.

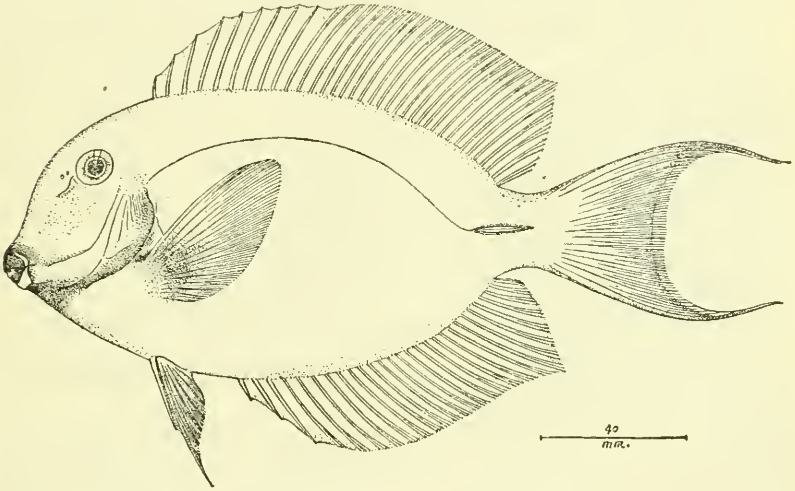

Fig. 14.—Hepatus leucosternon (Bennett)

7792. Danawan Island and Si Amil Island. September 27, 1909. Length 173 mm.

13299. Powati Harbor, Makyan Island. November 28, 1909. Length 193 mm.

13303. Dodepo and Pasajogo Islands, Gulf of Tomini, Celebes. November 16 1909. Length 180 mm.

A1477. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 227 mm.

A1166, 22822. Gane Road, Gillolo Island. December 1, 1909. Length 193 to 230 mm.

55558. U.S.N.M. Puako Bay, Hawaii. *Albatross* collection. Length 122 to 144 mm. Two examples. As *Hepatus umbra*, but evidently the present species.

55626. U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 46 mm.
57917 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 37 to 60 mm. Three examples.
57951. U.S.N.M. Zamboanga. Dr. E. A. Mearns. Length 43 to 58 mm. Six examples.
71602. U.S.N.M. Nafa, Okinawa. *Albatross* collection 1906. Length 87 to 126 mm. Seven examples. As *Hepatus dussumieri*.
72195 U.S.N.M. Calayan. R. C. McGregor. Length 117 mm.
84185 U.S.N.M. Philippine Islands. Dr. F. Baker. Length 77 mm.
55940 U.S.N.M. Bulan. Bureau of Fisheries. Length 165 mm.

HEPATUS GLAUCOPAREIUS (Schneider)

Harpurus glaucopareius (FORSTER) SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 212. Tahiti.

Acanthurus glaucopareius VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 190 (Oualan; Moluccas).—BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 1, No. 5, 1856, p. (6) 47 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 339 (type; Amboina); Journ. Mus. Godeffroy, vol. 4, 1875, p. 114, pl. 71, fig. A (Polynesia, East Indies).

Harpurus nigricans (not *Chaetodon nigricans* LINNAEUS) FORSTER, Fauna Indica, 1795, p. 15.

Acanthurus aliala LESSON, Voy. Coquille, Zool., vol. 2, pt. 1, 1830, p. 150. Oualan, Carolines.—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 416, pl. 2, fig. 2 (New Washington).

Teuthis aliala JORDAN and MCGREGOR, Rep. U. S. Fish Comm., pt. 24, 1898, (1899) p. 280 (Clarion and Socorro Islands).

Acanthurus kaber (MONTROUZIER) THIOLLIÈRE, Fauna Woodlark, 1857, p. 178 (name in synonymy).

Acanthurus blochi (not VALENCIENNES) STREETS, Bull. U. S. Nat. Mus., vol. 7, 1877, p. 68 (Honolulu).

Hepatus matoides (not VALENCIENNES) JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 352 (Apia).

Depth 1⅔ to 1¾; head 3¼ to 3⅖, width 1⅞ to 2. Snout 1⅕ to 1¼; eye 3 to 3⅓, 2⅔ to 2⅘ in snout, 1 to 1⅕ in interorbital; teeth 12 in each jaw; maxillary 3¼ to 3⅓ in head; interorbital 2⅞ to 3⅒, convexly elevated; opercle scarcely striate. Gill rakers 5+15, short, feeble points.

Scales minute, with obscure, crowded and extremely small circuli; apical denticles 12 to 15, with 5 or 6 series of transverse basal elements.

D. IX, 29 to 31, ninth spine 1¾ to 1⅘ in head, fifth ray 1⅔ to 1¾; A. III, 26 to 29, third spine 2⅛ to 2⅖, fifth ray 2 to 2⅕; caudal emarginate, points angular but not produced, fin 1 in head; least depth of caudal peduncle 2⅗ to 2⅘; pectoral 1 to 1⅛; ventral 1⅗ to 1¾.

Deep umber brown generally. Grayish crescent below eye. Whitish crescent around and across lower jaw, but not meeting above on snout. Iris olivaceous. Dorsals and anals blackish-brown, with very narrow grayish edge and whitish basal band expanding on posterior rays nearly to their ends. Caudal pale brownish, with submarginal pale crescentic band. Caudal spine pale and in pale groove. Pectoral pale olivaceous. Ventral neutral dusky, with lower front margin narrowly whitish.

East Indies, Philippines, Micronesia, Melanesia, Polynesia. A strongly marked species, with somewhat similar color pattern of *Hepatus achilles*, but without its red caudal blotch.

8940. Atulayan Island. January 18, 1909. Three examples 158 to 205 mm.

8954. Between Paron Point and Jesus Point, Luzon. June 21, 1909. Length 173 mm.

Two examples. Buena Vista, mouth of river, Guimares Islands. June 14, 1909. Length 51 to 60 mm.

16045. Cabugan Island, Hinunangan Bay, Leyte. July 20, 1909. Length 130 mm.

256. Caxisigan. December 29, 1909. Length 108 mm.

11866. Gubat, Sorsogon, Luzon. June 23, 1909. Length 113 mm.

15644. Rapu Rapu Island. June 22, 1909. Length 218 mm.

6896. Santo Domingo. November 7, 1908. Length 170 mm. Purplish generally, blackish about head. Preorbital broadly white, which broader than eye above. Gill opening with yellowish shades. Caudal peduncle becoming yellow, spine bright sulphur. Dorsal bright sulphur basally, widens to include most of last ray; narrow blue margin on spinous fin, becomes white on rayed fin; orange-red bar begins on last spine and extends under narrow black band to third from last ray where fading dusky; rest of fin dark. Anal like dorsal but without orange. Caudal whitish, entirely surrounded by blue white band and central area more dusky with yellow bar on front portion. Pectoral rays black, membranes hyaline with semicircular basal blotch. Ventral black, except narrow blue fronts, which become white on tip of first ray. Vent yellow. These examples differ a little in that the usual pale crescent from below the eye extends down and forward to maxillary to embrace pale band across chin. Also pectoral with pale base and colors on dorsals and anals greatly contrasted with very distinct whitish edges.

6959, 6960. West coast of Sabtan Island. November 8, 1908. Length 133 to 166 mm.

8020. Reefs in Apra Bay, Guam. November 19 to 21, 1907. Length 124 mm.

15397 U.S.N.M. Honolulu. Dr. T. H. Streets. Length 37 to 98 mm. 2 examples. As *Acanthurus blochii.*

52505 U.S.N.M. Samoa. Bureau of Fisheries. Length 135 to 195 mm. Three examples.

17973 U.S.N.M. Honolulu. Dr. T. H. Streets. Length 287 mm. Now uniform brown. Caudal well emarginated. As *Acanthurus blochii.*

52495 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 30 to 270 mm. Six examples. As *Hepatus matoides.*

55630 U.S.N.M. Jolo, Philippines. Dr. E. A. Mearns. Length 232 mm.

HEPATUS ACHILLES (Shaw)

Acanthurus achilles Shaw, Gen. Zool., vol. 4, 1803, p. 383. No locality.—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 218 (no locality).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 340 (China); Journ. Mus. Godeffroy, vol. 4, 1875, p. 115, pl. 71, fig. B (Samoa, Polynesia).—

Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 414, pl. 2, fig. 1 (Guam).

Acanthurus achilles Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 532 (Luzon, Cavite, Santa Cruz).

Teuthis achilles Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1899, p. 494 (Thornton Island, Polynesia).

Hepatus achilles Fowler, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 18 (French Frigate Shoals, Johnston and Wake Islands).

A large ovoid red blotch on side of tail including caudal spine, becomes yellow in preserved examples. Also narrow blue line along dorsal and anal bases and another around chin from one angle of mouth to the other. Caudal edged white, broadly so behind, blackish submarginally all around with median bright red crescent.

China, Philippines, Polynesia, Hawaii.

19235 U.S.N.M. Fanning Islands. Dr. T. H. Streets. Length 193 to 235 mm. Three examples.

51096 U.S.N.M. Hawaii. Bureau of Fisheries, 1904. Length 180 mm. [05371].

52475 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 165 mm.

55330 U.S.N.M. Honolulu reef. *Albatross* collection, 1906. Length 187 mm.

55484 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Length 184 to 193 mm. [1344]. Two examples.

HEPATUS GUTTATUS (Schneider)

Acanthurus guttatus Schneider, Syst. Ichth. Bloch, 1801, p. 215 (Tahiti).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 195 (Mauritius and Friendly Islands).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 329 (Tahiti, Aneiteum, Mauritius); Journ. Mus. Godeffroy, vol. 4, 1875, p. 109, pl. 69, fig. A (Mauritius, New Hebrides, Society Islands, Samoa, Kingsmills, Pelew Islands, Hawaii).

Harpurus guttatus (Forster) Schneider, Syst. Ichth. Bloch, 1801, p. 215 (name in synonymy).

Hepatus guttatus Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Wake Island).

Chaetodonton stellati Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1269. Friendly Islands.

Chaetodon stellatus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 140 (name in text).

Depth 1½ to 1⅓; head 3 to 3¼, width 1⅔ to 1⅘. Snout 1¼ to 1⅓ in head; eye 3¾ to 5⅕, 3⅕ to 4⅛ in snout, 2 in interorbital; teeth 14 or 13 in each jaw; maxillary 3½ to 4 in head; interorbital 2⅔ to 3, broadly convex; opercle with fine vertical striae. Gill rakers 5+16, short, feeble, cuneate points.

Scales very minute with obscure, crowded, and extremely small circuli; apical denticles 10 to 21, with 7 to 15 series of transverse basal elements.

D. IX, 28, ninth spine 2⅒ in head, fifth ray 1⅘ to 2; A. III, 23 or 24, third spine 2¼ to 2⅖, third ray 1⅔ to 2; caudal slightly emarginate behind, 3⅓ to 3¼ in combined head and body; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; pectoral $3\frac{1}{4}$ to $3\frac{2}{5}$ in combined head and body; ventral $1\frac{1}{6}$ to $1\frac{1}{5}$ in head; caudal spine 7.

Olivaceous-brown generally, scarcely paler on breast and belly. Obscure pale or light gray-brown vertical band from occiput to pectoral origin. Another, slightly wider and parallel from front of spinous dorsal base down to vent, broadening little below. Behind this trunk, tail, dorsal, and anal closely spotted with whitish spots, all greatly smaller than pupil and close-set. Dorsals and anals with dusky-brown to blackish ground color, and spots sparse on spinous dorsal. Caudal dull brown, dusky terminally. Paired fins uniform brownish. Caudal spine and groove brownish. Iris light brown.

Mauritius, Philippines, Melanesia, Micronesia, Polynesia, Hawaii. Known by its deep orbicular form and spotted coloration, the small white spots only on the posterior half of the body.

8871. Buang Bay, Talajit Island. March 15, 1909. Length 295 mm.

52321 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 126 to 178 mm. Four examples.

61699 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 232 mm.

66052 U.S.N.M. Tari Tari, Gilbert Islands. *Albatross* collection. Length 175 to 228 mm. Two examples.

HEPATUS TRIOSTEGUS (Linnaeus)

Chaetodon triostegus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 274. East Indies.—Broussonet, Ichthyologia, London, 1782, no pagination, plate (East Indies, Pacific Ocean near Tahiti and Hawaii).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1246 (Indian Ocean).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 436 (on Linnaeus).

Acanthurus triostegus Schneider, Syst. Ichth Bloch, 1801, p. 215 (Indian and Pacific Oceans).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 197 (Hawaii, Mauritius, Seychelles, Tahiti, Mariannes, New Zealand, Oualan, Society Islands).—Jenyns, Zool. Voy. Beagle, Fish., vol. 4, 1842, p. 75 (Cocos Island).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 237 (Wahai, Ceram); vol. 5, 1853, p. 320 (Amboina), p. 544 (Mesuwen Bay, Java); vol. 6, 1854, p. (90) 102 (Banda Neira, Batavia, Padang, Cauer, Priaman), p. 517 (Oelakan), p. 518 (Cocos Island); vol. 7, 1854, p. 38 (copied), p. 228 (Manado), p. 313 (Djinglsulon); vol. 8, 1855, p. 296 (Ternate), p. 445 (Cocos Island); vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 81 (Malang, Java), p. 385 (Kajeli, Buru); vol. 13, 1857, p. 372 (Sangi Islands), p. 478 (Karangbollong), p. 479 (Prigi); vol. 14, 1857, p. 245 (Prigi); vol. 15, 1858, p. 159 (Prigi), p. 200 (Goram); vol. 17, 1858–59, p. 130 (Atupoepoe, Timor); vol. 19, 1859, p. 331 (Patjitan), p. 333 (Karangbollong); vol. 20, 1859–60, p. 203 (Karangbollong); vol. 22, 1860, p. 89 (Prigi), p. 113 (Buru), p. 247 (Batoesendi, Bawean); Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48; Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Manado and Tamawanko); vol. 3, No. 9, 1857–58, p. 4 (Trussan), p. 5 (Priaman); vol. 5, No. 8, 1858–59, p. 2 (Tobariri, Celebes); vol. 8 (Sumatra), 1859, p. 10 (Priaman).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 327 (Amboina, Celebes, Malay Peninsula, Malay Archipelago, Aneiteum, type of *Teuthis australis*).—Bleeker, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol.

15, 1863, p. 21 (Hitu, Amboina).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 56 (Mozambique).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 108 (Polynesia, Hawaiian Islands).—DAY, Fishes of India, pt. 2, 1876, p. 204, pl. 48, fig. 2.—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (North Celebes; Macassar; Siao Sangi; Ternate).—DAY, Fauna Brit. India, vol. 2, 1889, p. 139, fig. 54 (Andamans; Madras).—THURSTON, Gov. Central Mus. Madras (Pearl Fish. Manaar), 1890, p. 92 (Pambas).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 531 (Luzon, Manila, Ilocos, Currimao, Samar).—JATZOW and LENTZ, Abh. Senckenb. Naturf. Ges., vol. 2, Heft 1, 1897, p. 514 (Aldabra).—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 34.—REGAN, Trans. Linn. Soc. London, 1908, p. 228 (Coetviy, Seychelles); Ann. Durban Mus., 1908, p. 246 (Kosi Bay).—GILCHRIST and THOMPSON, Ann. South Afric. Mus., vol. 6, pt. 2, 1908, p. 184 (Natal).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 316 (Menado, Karakelong, Salibabu, Binangka, Nusa Laut, Banda, Tuir, High Key, Roma, Timor, Rotti).—PELLEGRIN, Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Diego Suarez, Mahambo, Fort Dauphin, Madagascar).—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 407, pl. 1, fig. 1 (Paraoir, Tailon, Iba, Nasugbu, Puerto Galera, Calapan, Balabac, Tubigan, Pearl Bank, Paoay; Guam).

Rhombotides triostegus BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 271 (Atapupu, Timor); vol. 2, 1865, p. 142 (Buru); Verslagen en Mededeel. Akad. Wet. Amsterdam, vol. 2, ser. 2, 1868, p. 276 (Batjan), p. 284 (Solor); Verh. Akad. Wet. Amsterdam, vol. 18, No. 3, 1879, p. 2 (Mauritius).

Teuthis triostegus FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1900, p. 513 (Oahu).—JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 552 (Okinawa, Misaki).—OGILBY, Mem. Queensland Mus., vol. 5, 1916, p. 184 (Queensland).—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 778, pl. 31, fig. 5 (Natal).

Hepatus triostegus JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Cagayancillo; Calayan Island).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 423 (Tanegashima), p. 510 (Okinawa).—JORDAN and STARKS, Ann. Carnegie Mus., vol. 11, Nos. 3–4, November 5, 1917, p. 458 (Ceylon).—FOWLER, Proc. Acad. Nat. Sci., Philadelphia, 1925, p. 252 (Natal).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 71, 1927, p. 8 (Benkoelen, Sumatra).

Harpurus fasciatus (FORSTER) SCHNEIDER, Syst. Ichth. Bloch, 1801, pp. XXXVIII, 215. Huaine, Society Islands.

Acanthurus zebra LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 546, 548, pl. 6, fig. 3. East Indies.

Chaetodon couaga LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 726, 727. South Africa.

Teuthis australis GRAY, Kings Narr. Surv. Coast Australia, vol. 2, 1826, p. 435. West coast of Australia.

Acanthurus hirudo BENNETT, Fishes of Ceylon, 1828, pl. 11. Ceylon.

Acanthurus subarmatus BENNETT, Whaling Voy., vol. 2, 1840, p. 278. Society Islands.

Acanthurus pentazona BLEEKER, Nat. Tijds. Nederland. Indië, vol. 1, 1850, p. 107. Batavia; Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina).

Axinurus vedar (MONTROUZIER) THIOLLIÈRE, Fauna Woodlark, 1857, p. 181 (name in synonymy).

Acanthurus triostegus var. *polyzona* PETERS, Monatsber. Akad. Wiss. Berlin, 1876, p. 439. Mauritius.

Acanthurus triostegus var. *sandvicensis* STREETS, Bull. U. S. Nat. Mus., No. 7, 1877, p. 67. Honolulu.

Hepatus sandvicensis FOWLER and BALL, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Laysan, Lisiansky, Johnston Island, Wake Island, French Frigate, Necker).

Teuthis troughtoni WHITLEY, Rec. Australian Mus., vol. 16, No. 4, March 28, 1928, p. 233, pl. 16, fig. 1. Naunaha Island, Vanikoro Lagoon and Peu, Vanikoro, Santa Cruz Group.

Depth 1¾ to 1⅘; head 3 to 3¼, width 1¾ to 1⅞. Snout 1½ to 1⅔ in head; eye 2⅘ to 4, 1⅖ to 2¾ in snout, 1 to 1¼ in interorbital; teeth 14 to 18 in jaws, rather large; maxillary 3⅖ to 3⅗ in head; interorbital 2⅞ to 3, broadly convex; with age striae on humeral arch and rather obscure though coarser ones on preopercle flange and opercle. Gill rakers 5 + 16, short, bifid, rather flexible.

Scales ovate, very small, closely imbricate, with very minute circuli; apical denticles 9 to 12, with 3 to 5 transverse series mostly as well formed cusps.

D. IX, 22, i to 24, i, last spine 1⅘ to 2 in head, third ray 1½ to 2 in head; A. III, 20, i or 21, i, third spine 1⅞ to 2, first ray 2 to 2⅛; caudal slightly emarginate, truncate as expanded, 3½ to 4¼ in combined head and body; pectoral 1⅛ to 1¼ in head; ventral 1¼ to 1⅓; caudal spine 2 to 2⅓.

Body and head pale brown above, becoming white below. Five or six transverse dusky-brown to blackish narrow bands, narrowing below; first from occiput through eye down to lower cheek; second from front of spinous dorsal to pectoral axil, but not continued below base of fin; third from middle of spinous dorsal; fourth at front of soft dorsal; fifth close behind middle of soft dorsal; sixth, when present, irregularly as blotch or bar on caudal peduncle, either above or below. Dusky spot usually at pectoral base. Dark brownish line, usually present, bounds upper color of body from chin along lower side, at least to anal. Vertical fins all dull olivaceous to brownish, though anal with white border all around. Paired fins pale, ventrals whitish. Iris pale yellowish.

Mauritius, India, West Australia, East Indies, Philippines, Melanesia, Polynesia.

14316, 14318. Cabugan Island, Hinunangan Bay, Leyte. July 30, 1909. Length 115 to 145 mm.

14317. Same locality. July 31, 1909. Length 144 mm.

Three examples. Camiguin Island, from Malimoa fishermen. August 3, 1909. Length 55 mm.

13996. Gandra Island. September 20, 1909. Length 167 mm.

15526 [1701]. Langao Point, southern Luzon. June 24, 1909. Length 173 mm. Dark greenish above, fading white below. Transverse bars begin nearly as black spot at dorsal bases, fading to bistre below. Breast and belly white. Dark median band on front of head. Dorsals pale greenish, as body, dusky basally, especially anteriorly. Black blotch on caudal peduncle above at base of dorsal. Anal like dorsal, paler, anterior base dusky, margin with obscure whitish band. Caudal peduncle slightly dusky. Ventral immaculate.

22407, 22408. Nogas Point, Panay Island. February 4, 1908. Length 38 to 40 mm.

20753. Sablayan, Mindoro Island. December 13, 1908. Length 67 mm.

6547, 12192. San Roque, Leyte. July 29, 1909. Length 113 to 163 mm.

Two examples. Silino Island, tide pool. August 10, 1909. Length 34 to 50 mm.

20119. Ulugan Bay, Palawan Island. December 28, 1908. Length 115 mm.

6974. West coast of Sabtan Island. November 8, 1908. Length 173 mm.

Seven examples. Apra Bay, Guam. November 19 to 21, 1907. Length 95 to 145 mm. These are all typical of the species. Most have a dark longitudinal line or streak from lower side of chin, back until nearly over vent or anal in some cases, though often not much behind ventral bases.

The following are in the general series typical of *Hepatus triostegus:*

19234 U.S.N.M. Fanning Islands. Dr. T. H. Streets. Length 98 mm.

30550 U.S.N.M. New Guinea. Australian Museum. Length 180 mm.

30587 U.S.N.M. New Guinea. Australian Museum. Length 153 mm.

32689 U.S.N.M. Indian Archipelago. Leiden Museum. Length 160 mm.

43941 U.S.N.M. Mauritius. Colonel Nicholas Pike. Length 98 to 177 mm. Nine examples.

45065 U.S.N.M. Tahiti. British Museum. Length 52 mm.

45086 U.S.N.M. Samoa. Lord Lilford. Length 112 to 142 mm. Two examples.

47874 U.S.N.M. Bougainville Island. Australian Museum. Length 120 to 145 mm. Two examples.

50757 U.S.N.M. Okinawa, Riu Kiu. Jordan and Snyder. Length 210 to 217 mm. Two examples.

52341 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 32 to 168 mm. Eight examples.

65671 U.S.N.M. Mangareva. *Albatross* collection. Length 31 to 34 mm. Five examples.

66055 U.S.N.M. Jaluit, Marshalls. *Albatross* collection. Length 58 mm.

66056 U.S.N.M. Fakarava. *Albatross* collection, 1899. Length 31 mm.

66057 U.S.N.M. Arhno Atoll. *Albatross* collection, 1900. Length 28 mm.

71561 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 112 mm.

71669 U.S.N.M. Nafa. *Albatross* collection, 1906. Length 45 to 163 mm. Four examples.

72170 U.S.N.M. Fuga Island. R. C. McGregor. Length 132 mm.

72258 U.S.N.M. Cagayancillo. R. C. McGregor. Length 140 mm.

The following are all the Hawaiian or *sandvicensis* form:

5698 U.S.N.M. Hawaiian Islands. William Stimpson. Length 182 to 190 mm. Two examples.

15398 U.S.N.M. Honolulu Harbor. Dr. T. H. Streets. Length 32 to 123 mm. Twenty-seven examples.

26820 U.S.N.M. Johnston Island. Length 175 mm.

38287 U.S.N.M. Honolulu. Dr. W. H. Jones. Length 32 to 38 mm. Three examples.

51053 U.S.N.M. Hawaii. Length 187 mm.

55015 U.S.N.M. Puako Bay, Hawaii. *Albatross* collection. Length 175 mm.

55113 U.S.N.M. Puako Bay, Hawaii. *Albatross* collection. Length 170 mm.

55150 U.S.N.M. Hanalei Bay, Kauai. *Albatross* collection. Length 28 to 48 mm. Six examples.

55215 U.S.N.M. Napili. Bureau of Fisheries, 1902. Length 31 to 67 mm Forty-eight examples.

55333 U.S.N.M. Honolulu reef. Length 135 mm.

55335 U.S.N.M. Henshaw's Pool, Hilo. Bureau of Fisheries, 1901. Length 32 to 38 mm. Six examples.

55336 U.S.N.M. Waiahua Bay, Oahu. Bureau of Fisheries, 1903. Length 32 to 43 mm. Fourteen examples.

55334 U.S.N.M. Hanalei Bay. Length 187 mm.

55337 U.S.N.M. Hilo. *Albatross* collection. Length 32 to 55 mm. Thirteen examples.

55338 U.S.N.M. Necker. *Albatross* collection. Length 37 mm.

55339 U.S.N.M. Honolulu. *Albatross* collection. Length 127 to 146 mm. Three examples.

55340 U.S.N.M. Laysan Island. Length 168 mm.

55341 U.S.N.M. Laysan Island. Length 93 to 180 mm. Two examples.

55343 U.S.N.M. Puako Bay, Hawaii. Length 33 to 41 mm. Five examples.

55466 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Length 87 to 92 mm. Two examples.

63664 U.S.N.M. Locality? Length 190 mm.

78083 U.S.N.M. Hawaii. 1901. Length 32 to 68 mm. Nineteen examples.

78084 U.S.N.M. Kailua. Bureau of Fisheries. Length 33 to 52 mm. Four examples.

78085 U.S.N.M. Kailua. Bureau of Fisheries. Length 32 to 38 mm. Ten examples.

78086 U.S.N.M. Hilo. Bureau of Fisheries. Length 35 mm.

78089 U.S.N.M. Hilo. Bureau of Fisheries. Length 28 to 30 mm. Eight examples.

84084 U.S.N.M. Hawaii. Length 117 mm.

HARPURINA, new subgenus[7]

Front profile of body evenly lunate. Teeth small, crenulate, inconspicuous. Mouth small with very slight cleft laterally. Scales large, compact, closely imbricated. Lateral line concurrent with dorsal profile. Dorsal spines in reduced number, but 6 or 7 developed though of normal size. Posterior dorsal and anal rays longest. Caudal deeply emarginate. Paired fins longer than head. Caudal spine long.

Type.—*Hepatus nubilus*, new species.

A single species, readily known among the typical Hepatids by its reduced dorsal spines, etc.

HEPATUS NUBILUS, new species

Diagnosis.—Resembles *Hepatus lineolatus*, but is at once distinguished, aside from its fewer dorsal spines, by its more evenly convex anterior profile of the head, longer posterior dorsal and anal rays and larger scales. No distinct black spots at bases of last dorsal and anal rays. Reaches 240 mm. or more.

Type.—Cat. No. 89980, U.S.N.M.

---

[7] *Harpurus*, an old name for *Hepatus*.

Type locality.—Dodepo Island, Dutch East Indies.

Depth 1⅘ to 1⅞; head 4 to 4⅕, width 1⅗ to 1⅔. Snout 1⅗ to 1⅔ in head; eye 3 to 3⅓, 1⅞ to 2 in snout, 1⅕ to 1⅖ in interorbital; teeth 20 to 22 in jaws, small, inconspicuous; maxillary 3⅔ to 3¾ in head; interorbital 2¼ to 2⅓, convexly elevated; preopercle flange and opercle with few coarse striae, inconspicuous, more numerous, though coarse on humeral arch. Gill rakers 4? + 14, very short flexible points.

Scales large, broadly ovate, with very fine numerous circuli; 33 or 34 weak apical denticles, 7 to 9 transverse series of basal elements, often as more or less distinct cusps.

D. VI or VII, 27, I, last spine 1⅖ to 1⅘ in head, eighteenth ray 3⅘ to 4⅔ in combined head and body; A. III, 23, I or 24, I, third spine 1⅔ to 1⅞ in head, sixteenth ray 1 to 1⅛; caudal deeply emarginate, lunate, 2½ to 2⅔ in combined head and body; least depth of caudal peduncle 1¾ to 1⅘ in head; pectoral 3¼ to 3⅓ in combined head and body; ventral 3¾ to 4; caudal spine 2⅓ to 2⅞ in head.

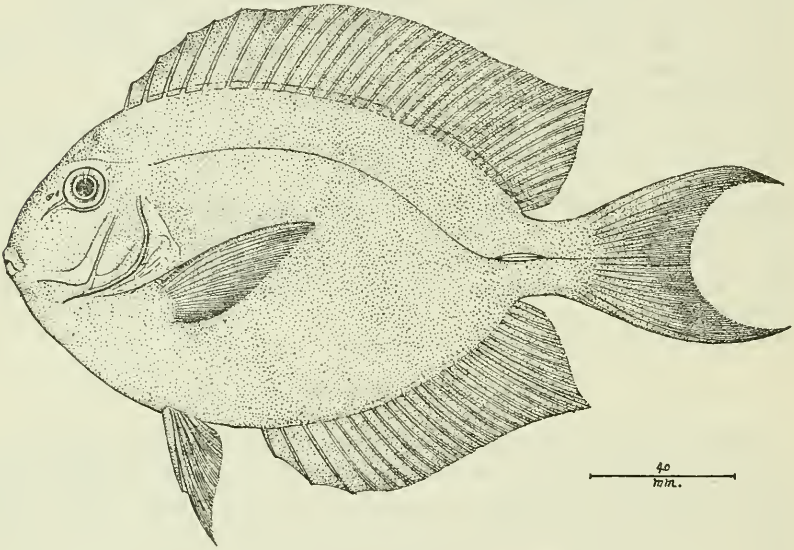

FIG. 15.—HEPATUS NUBILUS, NEW SPECIES

Largely dull dark brown with dusky over vertical fins and ventrals, pectorals with more brownish tinge. Iris brown.

A996, A997, A1033, A1034. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 210 to 228 mm. Nearly black, shading to brown under scales, probably dark seal brown with slaty streaks in life, of which usually 2 to each scale row. On side of head and breast brown in form of hexagonal spots in pale ground color, spots size of number 6 shot. No black shoulder blotch or black spots in axils of verticals. Fins nearly black. Dorsal with oblique bars extending upward and backward, best seen in reflected light. Oblique bars very indistinct on anal. Caudal without markings. Pectoral membranes hyaline.

A927 to A929, A935. Dodepo Island, Dutch East Indies. November 16, 1909. Length 210 to 243 mm. Type.

Genus ZEBRASOMA Swainson

Zebrasoma Swainson, Nat. Hist. Anim., vol. 2, 1839, p. 256. Type *Acanthurus velifer* Bloch, monotypic.

Acanthus Bloch, Naturg. Ausl. Fische, vol. 9, 1795, p. 105. Type *Acanthurus velifer* Bloch, monotypic.

Scopas Bonaparte, Prosp. Sist. Gener. Ittiol. (Saggio dist. anim. vert.), 1831, p. 109. Nomen nudum. Type *Acanthurus scopas* Valenciennes, tautotypic, affixed by Jordan, Genera of Fishes, pt. 2, 1919, p. 175.

Laephichthys Ogilby, Mem. Queensland Mus., vol. 5, 1916, p. 173. Type *Acanthurus rostratus* Günther, orthotypic.

Snout short, deep, little produced. Jaws with single row of strong, fixed incisors. Dorsal fin with 3 to 5 flexible spines. Soft dorsal and anal well elevated. Ventral rays 5. Tail with pair of erectile spines.

Indo-Pacific. A number of nominal species have been described, most of which appear to evolve into the few we arrange below.

ANALYSIS OF THE SPECIES

a^1. Zebrasoma. Snout moderately pointed, not especially produced; dorsal spines moderate; variably yellow to olive or dusky.
  b^1. Dorsal rays 30 to 32; dusky or deep brown with transverse bands on head and body ---------- **veliferum**
  b^2. Dorsal rays 23 to 28.
    c^1. Body brown, covered with small white dots ---------- **gemmatum**
    c^2. Body yellow to olive or deep brown, sometimes with minute bluish dots or fine undulating lines ---------- **flavescens**
    c^3. Blackish, head and shoulders reticulated with gray; caudal yellow; pectoral yellow terminally ---------- **xanthurum**
a^2. Laephichthys. Snout produced; dorsal spines strong; uniform black. **rostratum**

ZEBRASOMA VELIFERUM (Bloch)

Acanthurus velifer Bloch, Naturg. Ausl. Fische, vol. 9, 1795, p. 106, pl. 427, fig. 1. No locality (collection M. John).—Rüppell, Atlas Reise Nordl. Afrika, Fische, 1828, p. 58, pl. 15, fig. 2 (Mohila).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 251 (Mauritius, East Indies, Red Sea).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 518 (Cocos Island); vol. 7, 1854, p. (38) 42 (Cocos Island); vol. 8, 1855, p. 306 (Batoe Island).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 344 (Fiji).—Playfair, Fishes of Zanzibar, 1866, p. 57 (Zanzibar).—Martens, Verh. zool. bot. Ges. Wien., vol. 16, 1866, p. 378 (Koseir, Red Sea).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 505 (Red Sea).—Day, Fishes of India, pt. 1, 1875, p. 207; Fauna Brit. India, vol. 2, 1889, p. 144 (Andaman Islands).—Thurston, Gov. Central Mus. Madras (Pearl Fisher., Manaar), 1890, p. 92.—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 344 (on *Acanthure élégant* Liènard, Treiz· rapp. Soc. hist. nat. Maurice, 1843, p. 69).

Acanthurus (*Harpurus*) *velifer* Klunzinger, Fische Roth. Meer., 1884, p. 85.

Zebrasoma veliferum Jordan and Evermann, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 396, fig. 173 (Honolulu and Samoa).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 443, pl. 11 (Olongapo, Balanacan, Elefante, Tablas, Bantayan, Agutaya, Jolo, Cebu?).

Acanthurus suillus Valenciennes, Hist. Nat. Poiss., vol. 10, 1830, p. 254. Mauritius (on Vlaming and Renard).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 345 (copied).

Acanthurus ruppelii Bennett, Proc. Zool. Soc. London, pt. 3, 1835, p. 207 (on *Acanthurus velifer* Rüppell).

Acanthurus ruppellii Bleeker, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. (445) 451 (Cocos Island); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 3, No. 7, 1857–58, p. 1 (Amboina); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 15, 1863, p. 266 (Ternate).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 345 (Red Sea).

Acanthurus ruppelli Bleeker, Nat. Tijds. Nederland. Indië, vol. 20, 1859–60, p. 202 (Cocos Island).

Acanthurus blochii Bennett, Proc. Zool. Soc. London, 1835, p. 207. Tranquebar (on *Acanthurus velifer* Bloch).

Acanthurus hypselopterus Bleeker, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 327. Larantuka, Floris Island.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 344 (copied); Journ. Mus. Godeffroy, vol. 4, 1875, p. 117 (Samoa, Misol, Pelew Islands, Fiji).—Steindachner, Denks. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 70, 1902, p. 494, pl. 4, fig. 1.

Zebrasoma hypselopterum Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 135 (Raine Island); vol. 5, 1916, p. 174, pl. 23 (Raine Island example).

Acanthurus desjardinii Bennett, Proc. Zool. Soc. London, pt. 3, 1835, p. 207. Mauritius.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 344 (type).—Playfair, Fishes of Zanzibar, 1866, p. 57 (Zanzibar).

Acanthurus maristarum Thiollière, Fauna Woodlark, 1857, p. 180. Woodlark Island.

Acanthurus viaged (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 180 (name in synonymy).

Naseus strigatus De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1885, p. 539. Queensland Coast.

Depth 1⅓ to 1⅞; head 2⅞ to 3⅔, width 2 to 2½. Snout 1½ to 1¾ in head; eye 2¼ to 4, 1½ to 3⅔ in snout, greater than interorbital in young to 1⅔ in adult; teeth 14 to 16 in each jaw; maxillary 4 to 4⅔ in head; interorbital 3⅕ to 3½, broadly convex; preopercle limb, opercle below and humeral region striate. Gill rakers 3+6, short points, weak.

Skin minutely asperous, without distinct scales.

D. IV, 30 to 32, fourth spine 1¾ to 2⅔ in combined head and body, second ray 1¼ to 2⅕; A. III, 22 to 25, third spine 1¼ to 1⅞ in head, fourth ray 1⅖ to 3⅓ in combined head and body; caudal 1 to 1⅓ in head, truncate behind; least depth of caudal peduncle 3 to 4; pectoral 2¾ to 3¼ in combined head and body; ventral 1⅕ to 1¼ in head; caudal spine 1 to 3 in eye.

Chocolate brown generally. Muzzle with 5 whitish vertical bands, 6 in young and first two or three bands lightest, others gradually pale and obscure. Within ensuing dark areas 3 or 4 parallel vertical dark lines. Old examples often with muzzle dark and more or less variegated. Iris gray white, except as crossed by dark vertical band which little wider than pupil but not wide as eye itself. Dorsals and anals deep neutral dusky, with waved obscure deep gray obliquely longitudinal lines. Other fins dusky terminally and both caudal and pectoral quite light in young. The caudal peduncle is deep brown, though nearly blackish in the young.

Red Sea, Zanzibar, Madagascar, Mauritius, Bourbon, Seychelles, East Indies, Queensland, Micronesia, Melanesia, Polynesia, Hawaii.

We are unable to accept Ogilby's contention that "the color scheme of *Zebrasoma hypselopterum* is not only quite distinct from that of *Zebrasoma veliferum*, but is constant at all ages, as may be seen from the descriptions of Bleeker's small and my large examples." Our materials show that these differences appear to be the result of preservation.

It is quite likely that the imperfect *Acanthurus suillus* account may have been another attempt to describe this species. According to Günther it is light gray-brown, minutely dotted and spotted with black. The gray fins are with a reddish line along dorsal and anal bases.

13729. Alimango Bay, Burias Island. March 5, 1909. Length 165 mm.
8362. Atulayan Island. June 18, 1909. Length 198 mm.
8120. Burias Island. March 5, 1909. Length 210 mm.
16017. Busin Harbor, Burias Island. April 22, 1908. Length 144 mm.
7858, 9446. Candaraman Island, Balabac. January 4, 1909. Length 122 to 193 mm.
12274. Chase Head, Endeavor Strait. December 22, 1908. Length 175 mm.
13933, 13934. Cebu market. April 4, 1908. Length 155 mm.
5367, 5372. Cebu market. April 5, 1908. Length 195 to 230 mm.
21741. Cebu market. September 3, 1909. Length 54 mm.
12481. Endeavor Strait. December 23, 1908. Length 160 mm.
7247 to 7249. Masinloc Bay, Zambales. November 22 and 23, 1908. Length 210 to 243 mm. Snout and chin covered with round light gray dots over ground color of deep brown. Dark brownish purple band passes in front of dorsal through eye, across cheek to base of ventral; width not quite that of eye. Four broad bands of same color posteriorly to caudal peduncle. These bands also contain 5 deep brown stripes which in upper part of first band and in lower part of second, third and fourth break into brown dots. Light bars between darker contain 1 or 2 brownish-yellow stripes. Dorsal with deep purple brown edge, becoming very deep brown lower. Bluish-white spots on rays of central part of dorsal, forming broken lines near posterior margin. Pectorals hyaline purplish.
7287. Paluan Bay, Mindoro. December 11, 1908. Length 203 mm.
8752. Parangpong Island. June 10, 1909. Length 288 mm.
8907. Rosa Island. June 17, 1909. Length 300 mm.
22902 [491]. Romblon reef. March 25, 1908. Length 64 mm. Sides barred with dark olive green and lemon yellow alternately; dark bars fading resolve into 2 brownish bars with pale central dividing line; postocular and next of yellow bars

margined with white below; posteriorly yellowish bars become narrower or even obsolete on caudal peduncle; head and front of ocular band dusky lemon yellow, breast brighter. Dorsal and anal like darker body color, bars obsolete; on hind part of dorsal about 4 pale lines; vertical edges of both fins white. Caudal peduncle black. Caudal dusky hyaline, lemon yellow at base. Ventral lemon yellow, becoming blackish toward margin.

7310. Sablayan Bay, Mindoro. December 12, 1908. Length 298 mm.

6904. Santo Domingo, Batan. November 7, 1908. Length 290 mm.

5826. Tataibada Port. May 15, 1908. Length 223 mm.

7179, 7185. West coast of Palaui Island. November 18, 1908. Length 200 to 220 mm.

6958. West coast of Sabtan Island. November 8, 1908. Length 250 mm.

8726. Yaua River, Caracaran, Batan Island. June 8, 1909.

A881. Limbe Strait, Celebes. November 10, 1909. Length 180 mm.

19790. Gomomo Island. December 3, 1909. Length 90 mm.

21294 U.S.N.M. No locality. Length 183 mm. As *Zebrasoma rüppelii.*

30588 U.S.N.M. New Guinea. Australian Museum. Length 163 mm.

30606 U.S.N.M. New Guinea. Australian Museum. Length 185 mm.

52350 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 58 to 260 mm. Three examples.

52745 U.S.N.M. Hawaiian Islands. Bureau of Fisheries 1901–2. Length 285 mm.

55332 U.S.N.M. Honolulu reef. *Albatross* collection. Length 119 to 125 mm. Two examples.

55546 U.S.N.M. Hawaiian Islands. Length 102 to 112 mm. Two examples.

65393 U.S.N.M. Rikitea, Mangareva. *Albatross* collection. Length 145 mm.

66084 U.S.N.M. Tahaa, Society Islands. *Albatross* collection. Length 227 to 252 mm. Two examples.

82944 U.S.N.M. Samoa. Wilkes Exploring Expedition. Length 68 mm.

ZEBRASOMA GEMMATUM (Valenciennes)

Acanthurus gemmatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 255. Mauritius.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 343 (copied).

Depth 2⅕ in total. Front with weakly sigmoid profile. Eye scarcely above middle in head depth. Teeth 14 in each jaw, oval, well serrated. Scales minute. D. IV, 28, spines strong. A. III, 24, spines strong. Dorsal and anal moderately elevated, half body depth. Caudal truncate. Brown, marked everywhere with small white spots, somewhat in longitudinal rows on body. Caudal yellow, without dots. Length 101 mm. (Valenciennes.)

Differs from *Zebrasoma veliferum* in the different color pattern, the body marked with small white dots.

ZEBRASOMA FLAVESCENS (Bennett)

Acanthurus flavescens BENNETT, Zool. Journ., vol. 4, 1828, p. 40. Hawaiian Islands; Proc. Zool. Soc. London, 1831, p. 61 (Mauritius).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 116, pl. 76 (Society Islands, Tahiti, Samoa, Hawaii, New Hebrides).—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 342.

Zebrasoma flavescens JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 555 (Okinawa and Hawaii).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar).—FOWLER and BALL, Bishop Mus.

Bull., No. 26, 1925 (1926), p. 19 (Johnston Island).—Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 441 (Calapan, Bulalacao, New Washington, Estancia, Tubigan, Sibutu, Dumaguete).

Acanthurus rhombeus Kittlitz, Mus. Senckenb., vol. 1, 1834, p. 196, pl. 13, fig. 16. Ulea Island, Carolines.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 342 (Ceram, Aneiteum, Hawaii).—Playfair, Fishes of Zanzibar, 1866, p. 57 (Zanzibar).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (Ternate).

Harpurus rhombeus Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 271 (Atapupu, Timor); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 16, 1864, p. 365 (Nusa Laut, Moluccas); vol. 2, ser. 2, 1868, p. 272 (Guebe, Moluccas).

Zebrasoma rhombeum Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 34 (Panay).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 270 (Cagayancillo).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Calapan).

Acanthurus scopas Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 245, pl. 290. Dorey Harbor, New Guinea; Mauritius; Ulea.—Bleeker, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 228 (Banda, Neira), p. 348 (Larantuka Straits, Solor); vol. 5, 1853, p. 68 (Solor), pp. 319, 320 (Amboina); vol. 6, 1854, p. 90 (Banda, Neira), p. 313 (Larantuka, Floris Island); vol. 8, 1855, p. 276 (Ternate), p. 306 (Batoe Island); vol. 9, 1855, p. 106 (Sabu, Halmaheira); vol. 11, 1856, p. 95 (Banda); vol. 12, 1856, p. 230 (Batu Island), p. 508 (Wahaai, Ceram); vol. 17, 1858–59, p. 130 (Atapupu, Timor); vol. 22, 1860, p. 113 (Buru); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina).

Acanthurus altivelis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 249. East Indies and Mauritius.

Zeus elevatus (Parkinson) Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 249 (name in text).

Acanthurus goramensis Bleeker, Nat. Tijds. Nederland. Indië, vol. 15, 1858, p. (200) 208. Goram Island.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 343 (copied).—Jatzow and Lentz, Abh. Senckenb. Naturf. Ges., vol. 24, 1898, pl. 36, fig. 11.

Acanthurus virgatus Vaillant and Sauvage, Rev. Mag. Zool., vol. 3, 1875, p. 283. Honolulu.

Zebrasoma agana Seale, Occas. Papers Bishop Mus., vol. 1, No. 3, 1901, p. 110. Agaña, Guam.

Zebrasoma rostratum (not Günther) Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 356 (Samoa).

Zebrasoma veliferum (not Bloch) Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 26, No. 7, 1911, p. 311 (Tahaa, Society Islands).

Depth 1⅗ to 1¾; head 2⅘ to 3⅕, width 2 to 2⅛. Snout 1⅕ to 1¼ in head; eye 3⅔ to 4¼, 2⅘ to 3½ in snout, 1 to 1½ in interorbital; teeth 20 to 22 in jaws, moderate; maxillary 3⅞ to 4½ in head; interorbital 3 to 3⅕, broadly and slightly convex; opercle and humeral arch with fine striae, obsolete on former with age. Gill rakers 4 + 7, short, robust, fleshy points.

Skin with firmly adherent semiosseous scales, forming strong integument, scarcely detachable and forming finely asperous surface. On middle of tail especially behind, or before caudal spine large and more roughly spinescent area; quite restricted in young examples.

D. V, 23, i or 24, i, last spine $1\frac{1}{6}$ to $1\frac{1}{4}$ in head, third ray 1 to $1\frac{1}{8}$; A. III, 19, i or 20, i, third spine $1\frac{2}{5}$ to $1\frac{3}{4}$, third ray $1\frac{1}{8}$ to $1\frac{1}{4}$; caudal with hind edge slightly convex, $1\frac{1}{4}$ to $1\frac{3}{5}$; least depth of caudal peduncle $2\frac{7}{8}$ to $3\frac{2}{3}$; pectoral 1 to $1\frac{1}{8}$; ventral $1\frac{1}{10}$ to $1\frac{1}{3}$; caudal spine 1 to $1\frac{3}{5}$ in eye.

Largely uniform dark brown, variably from chocolate to seal brown. With age head and body with minute grayish dots, more or less forming as streaks about margins of scales, whole appearance with inconspicuous longitudinal more or less waved lines. Iris dark brown. Vertical fins dusky, with age greater basal half neutral black and outer half dusky olive, though not greatly contrasted. Pectoral pale brownish to yellowish. Ventral blackish. Membranes in sheath of caudal spine whitish.

Mauritius, East Indies, Philippines, Melanesia, Polynesia, Hawaii. The species is apparently dichromatic. All our Philippine and East Indian materials listed below are of the dark phase.

12996, 15155. Alibijaban Island, Luzon. Length 124 to 150 mm.

11199, 11201, 15691, 16015. Alimango Bay, Burias Island. Length 105 to 115 mm.

16276. Biri Channel. June 1, 1909. Length 138 mm.

14897, 14899. Biri Channel. June 2, 1909. Length 105 to 126 mm.

9864. Bolalo Bay, Palawan Island. December 21, 1908. Length 140 mm.

15969. Bugsuk Island. June 5, 1909. Length 148 mm.

298. Busin Harbor, Burias Island. March 8, 1909. Length 85 mm. Purplish slate. Small black blotches at axils of vertical fins. Breast with numerous round bronze spots, likewise side of head. Iris narrowly golden. Dorsal tipped black, barred with narrow paler bands. Anal narrowly tipped blue, anteriorly with submarginal black line continued posteriorly as margin. Caudal slate, with white margin in fork. Pectoral membranes hyaline, rays dusky orange, edge blackish. Ventral bluish on front and edge.

16460. Busin Harbor, Burias Island. April 22, 1908. Length 165 mm.

15903. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 148 mm.

6857, 6858. Caxisigan Island. January 2, 1909. Length 96 to 118 mm.

272. Cagayanes Island. March 31, 1909. Length 129 mm.

5383, 7571. Cebu market. April 6, 1908. Length 87 to 95 mm.

18466. Cebu market. April 15, 1908. Length 122 mm.

10892. Dasol Bay. March 9, 1909. Length 130 mm.

15111, 15841. Dupon Port, Leyte. March 17, 1909. Length 88 to 137 mm.

15470, 15471, 18280. Galera Bay, Mindanao Island. June 9, 1908. Length 102 to 148 mm.

14375, 14629. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 126 to 129 mm.

14434. Gubat, Sorsogon, Luzon. June 23, 1909. Length 115 mm.

18864. Inamucan Bay. August 8, 1909. Length 128 mm.

193, 15527. Langao Point, Luzon. June 24, 1909. Length 145 to 152 mm. Seal brown, changing to light olive green. Body with very fine, numerous lines of pearl blue, breaking as dots on head and breast. Iris brown. Dorsal greenish black. Anal and caudal slate. Pectoral with orange shades and narrow line on first ray. Ventral greenish black.

21038. Little Santa Cruz Island. May 28, 1908. Length 114 mm. White streak from opposite opercle back along median axis to villi of tail.

19821. Mactan Island, Cebu. March 25, 1909. Length 110 mm.

7882. Maculabo Island. June 14, 1909. Length 133 mm.

6775, 6776. Malanipa Island. September 8, 1909. Length 177 and 178 mm.

4700, 8884, 14930. Mansalay, Mindoro Island. June 4, 1908. Length 130 to 153 mm.

5112. Mantacao Island, west coast of Bohol. April 8, 1908. Length 97 mm.

11379. Maricaban Island, Luzon. January 20, 1908. Length 115 mm.

10496. Maricaban Island. July 21, 1908. Length 73 mm.

9049, 9050. Masbate Reef, Masbate. April 20, 1908. Length 115 to 145 mm.

16507, 16510. Murcielagos Bay. August 9, 1909. Length 99 to 127 mm.

15753, 20561. Opol, Mindanao. August 4, 1909. Length 104 to 117 mm.

15163. Pagapas Bay. February 20, 1909. Length 140 mm.

15681. Palag Bay vicinity, Luzon. June 16, 1909. Length 122 mm.

19063. Paluan Bay, Mindoro. December 11, 1909. Length 138 mm.

21. Pandanon Island. March 23, 1909. Length 120 mm.

16893, 16894. Parang, Mindanao. May 23, 1908. Length 140 mm.

11130. Pasacao, Ragay Gulf. March 9, 1909. Length 120 mm.

17875, 17881, 17883. Polloc, Mindanao. May 22, 1908. Length 100 to 130 mm.

11257, 14716. Port Caltom. December 15, 1908. Length 140 mm.

12958, 17735, 21637. Port Jamelo, Luzon. July 13, 1908. Length 110 to 120 mm.

10345, 10347, 10496. Port Maricaban. July 21, 1908. Length 64 to 113 mm.

16516, 20798, 22252. Port Matalvi, Luzon. November 22, 1908. Length 104 to 120 mm.

8430, 9427, 10998, 10999, 11000, 17540. Port Matalvi. November 23, 1908. Length 110 to 138 mm.

15650. Rapu Rapu Island. June 22, 1909. Length 150 mm.

14758. Romblon. March 26, 1908. Length 102 mm.

11400. Sabtan Island. November 8, 1908. Length 130 mm.

13367, 13369. Sablayan Island, Mindoro. December 12, 1908. Length 115 to 120 mm.

15707. Sanguisiapo Island. February 24, 1908. Length 115 mm

12684. San Miguel Island. June 4, 1909. Length 97 mm.

12190, 12191. San Roque, Leyte. July 29, 1909. Length 115 to 134 mm.

10368, 10369. Tilig, Lubang Island. July 14, 1908. Length 120 to 143 mm.

19591. Simaluc Island. April 22, 1909. Length 63 mm.

12235. Simaluc Island. September 22, 1909. Length 153 mm.

12702 to 12704. Tara Island. December 14, 1908. Length 102 to 123 mm.

7939 to 7941, 191, 193. Tataan Island, Tawi Tawi Group. February 20, 1908. Length 93 to 125 mm.

10448, 18755, 19145, 19146. Tilig, Lubang. July 14, 1909. Length 93 to 148 mm.

15530, 18877. Tilig. July 15, 1909. Length 91 to 140 mm.

264, 19058. Tutu Bay, Jolo. September 19, 1909. Length 110 to 124 mm.

7178, 7180, 7181. West coast of Palaui Island. November 18, 1908. Length 145 to 165 mm.

6985. West coast of Sabtan Island. November 9, 1908. Length 140 mm. Body bister, fading to yellowish anteriorly. Head and breast peppered with very small blue dots. Tip of snout and chin opaque. Fins slightly darker than body, except pectoral, spines opaque, rays umber and membranes hyaline.

14393. Talisse Island. November 9, 1909. Length 102 mm.

13253. Birabirahan Island. December 31, 1909. Length 133 mm.

20471. Danawan Island and Si Amil Island. September 28, 1909. Length 48 mm.

14739. Kayoa Island. November 29, 1909. Length 132 mm.

14636, 14637, 22228. Buka Buka Island, Gulf of Tomini, Celebes. November 20, 1909. Length 75 to 127 mm.

16225, 21121. Cape Kait, Libani Bay, Celebes. December 29, 1909. Length 65 to 108 mm.

9501. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 80 mm.

21450. Una Una Road, Gulf of Tomini, Celebes. November 17, 1909. Length 68 mm.

14643. Tidore Island, south of Ternate. November 24, 1909. Length 139 mm.

22305. Tidore Island. November 29, 1909. Length 88 mm.

A1270. Uki, Buru Island. December 9, 1909. Length 163 mm.

30617 U.S.N.M. New Guinea. Australian Museum. Length 128 mm.

30618 U.S.N.M. New Guinea. Australian Museum. Length 107 mm.

52462 U.S.N.M. Apia. Bureau of Fisheries. Length 37 to 88 mm. Two examples. As *Zebrasoma rostratum.*

52507 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 34 to 157 mm. Four examples.

Two examples (with 66084 U.S.N.M.). Tahaa, Society Islands. *Albatross* collection. Length 167 to 188 mm. As *Zebrasoma veliferum.*

The following are all the yellow phase:

55026 U.S.N.M. Puako Bay, Hawaiian Islands. *Albatross* collection, 1906. Length 138 to 163 mm. Two examples.

55546 U.S.N.M. Hawaiian Islands. *Albatross* collection. Two examples.

51052 U.S.N.M. Hawaiian Islands. Length 180 mm. One example.

58530 U.S.N.M. Honolulu. E. L. Berndt. Length 105 to 123 mm. Three examples.

ZEBRASOMA XANTHURUM (Blyth)

Acanthurus xanthurus Blyth, Prodr. Faun. Ceylon, Kelaart, Append., 1852, p. 50. Ceylon.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 343 (copied).—Playfair, Fishes of Zanzibar, 1866, p. 57, pl. 8, fig. 4 (Aden).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 504 (Red Sea).—Day, Fishes of India, pt. 1, 1875, p. 207; Fauna Brit. India, vol. 2, 1889, p. 144.

Acanthurus (Harpurus) xanthurus Klunzingr, Fische Roth. Meer., 1884, p. 85 (Koseir).

Depth 2⅓ in total. D. V, 24 or 25; A. III, 20 or 21. Blackish, caudal yellow. Head and shoulders reticulated with gray. Pectoral yellowish terminally. Length 204 mm. (Day.)

ZEBRASOMA ROSTRATUM (Günther)

Acanthurus rostratus Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 117, pl. 66, fig. B. Society Islands.

D. V, 24; A. III, 20. Uniform black. Length 178 mm. (Günther.)

This little-known species forms the subgenus *Laephichthys* Ogilby, in its strong dorsal spines and produced snout. It parallels in *Zebrasoma* the subgenus *Lo* in *Siganus.* The examples in the U. S. National Museum reported as this species by Jordan and Seale are *Zebrasoma flavescens.* The species does not appear to have been seen since Garrett's figure was made.

Genus NASO Lacépède

Naso LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, p. 104. Type *Naso fronticornis* LACÉPÈDE=*Chaetodon unicornis* FORSKÅL, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 61.

Naseus (COMMERSON) LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, p. 105. Type *Naseus fronticornis fuscus* (COMMERSON) LACÉPÈDE=*Chaetodon fronticornis* LINNAEUS, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 69.

Monoceros (not MEUSCH 1787) SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 180. Type *Monoceros biaculcatus* SCHNEIDER=*Chaetodon unicornis* FORSKÅL, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 58.

Nasonus RAFINESQUE, Analyse de la nature, 1815, p. 83. Type *Naso fronticornis* LACÉPÈDE, virtually (as *Nasonus* RAFINESQUE proposed to replace *Naso* LACÉPÈDE).

Priodon (CUVIER) QUOY and GAIMARD, Voy. Uranie, Zool., January 29–May 26, 1825, p. 377. Type *Priodon annulatus* QUOY and GAIMARD, monotypic.

Priodontichthys BONAPARTE, Prosp. Sist. Gener. Ittiol. (Saggio, dist. Anim. Vert.), 1831, p. 109. Type *Priodon annulatus* QUOY and GAIMARD, virtually (as *Priodontichthys* BONAPARTE proposed to replace *Priodon* (CUVIER) QUOY and GAIMARD).

Axinurus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 299. Type *Axinurus thynnoides* VALENCIENNES, monotypic.

Keris VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 304. Type *Keris anginosus* VALENCIENNES, monotypic.

Ceris GÜNTHER, Zool. Record, vol. 2, Pisces, 1865, p. 187. Type *Keris anginosus* VALENCIENNES.

Callicanthus SWAINSON, Nat. Hist. Anim., vol. 2, 1839, p. 256. Type *Aspisurus elegans* RÜPPELL=*Chaetodon lituratus* FORSKÅL, monotypic.

Body oblong, compressed. Caudal peduncle with 2 large, firm, bony, keeled plates, absent in young. Head in adult with prominent forehead, developing very long, bony horn above eyes, absent in young. Teeth small, uniserial, slightly compressed incisors with edges usually serrated. Dorsal spines 5 or 6. Anal spines 2, first small spine absent. Ventral incomplete, with spine and 3 rays.

Indo-Pacific. Mostly dark in coloration and moderate or large in size. Noteworthy is the frontal horn and large ornate spines on the caudal peduncle.

ANALYSIS OF THE SPECIES

a^1. Forehead with elongated conic hornlike protuberance or crestlike hump above snout in adult.
  b^1. NASO. Forehead with conic rostral protuberance.
    c^1. Snout long or produced below rostral protuberance; caudal and pectoral fins uniform.
      d^1. Frontal horn with axis on level with upper half of orbit; dorsal spines about half of head -- **unicornis**
      d^2. Frontal horn with axis passing through orbit; dorsal spines about ¼ of head -- **brachycentron**
    c^2. Snout moderate or very short below rostral protuberance; hind caudal and pectoral edges whitish.
      e^1. Frontal horn passing through center of orbit; snout short - **brevirostris**
      e^2. Frontal projecting protuberance placed below level of orbital center; snout moderately produced -------------------------- **annulatus**

b^2. CYPHOMYCTER, new subgenus.[8] Type *Naso tuberosus* Lacépède. A convex and compressed crestlike hump above snout in the adult.

f^1. Brown, with black or blue dots or short vertical lines; fins blackish, verticals with white edges; caudal without filaments **tuberosus**

f^2. Deep brown, blue spots on head and upper and lower edges of body; middle of sides with numerous close-set, vertical gray-blue, lines; caudal ends in 2 long filaments ---------------------- **eoume**

a^2. Head without horn or hump at any age.

g^1. CALLICANTHUS. Tail with 2 bucklers each side.

h^1. Dorsal and anal each with 26 to 29 rays.

i^1. Yellow band from eye and nostrils arches down till behind mouth angle; dorsal dark with white margin; caudal bucklers orange; caudal ends in 2 long filaments_**lituratus**

i^2. No yellow band on side of snout; caudal bucklers dull; caudal without filaments.

j^1. Depth 1⅞ to 3; eye 2⅔ to 3¾ in head---- **hexacanthus**

j^2. Depth 2⅗; eye 5 to 5⅖ in head ------- **genimarginatus**

j^3. Depth 3 to 3⅖; eye 4 to 5¾ in head----------- **vomer**

h^2. Dorsal and anal each with 23 to 25 rays; soft dorsal and anal narrowly white-edged and each with 3 longitudinal blackish bands; hind caudal and pectoral edges pale; depth 2½ to 2⅔; eye 3¾ to 4⅘ in head---------------- **tapeinosoma**

g^2. AXINURUS. Tail with a single buckler each side; teeth very small, tapering, not serrated. Dorsal and anal brown, with several whitish oblique longitudinal bands, fin edges also narrowly whitish-------------------------------- **thynnoides**

NASO UNICORNIS (Forskål)

Chaetodon unicornis FORSKÅL, Descr. Animal., 1775, pp. XIII, 63. Djedda, Red Sea.—GMELIN, Syst. Nat. Linn., 1789, p. 1268 (Arabia).—WALBAUM, Arted. Pisc., vol. 3, 1792, p. 440 (on FORSKÅL).

Chetodon unicornis BONNATERRE, Tabl. Ichth., 1788, p. 82, pl. 95, fig. 39 (Red Sea).

Aspisurus unicornis RÜPPELL, Atlas Reise Nördl. Afrika, Fische, 1828, p. 60 (Red Sea).

Naseus unicornis GÜNTHER Cat. Fish. Brit. Mus., vol. 3, 1861, p. 348 (Ceylon, Frankland Island, Red Sea, Aneiteum).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 512 (Koseir, Red Sea).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 118, pl. 78, figs. 1–4 in text (Huahine, Tahiti).—PETERS, Monatsber. Akad. Wiss. Berlin, 1876, p. 440 (Mauritius).—DAY, Fishes of India, pt. 2, 1876, p. 209.—STREETS, Bull. U. S. Nat. Mus., No. 7, 1877, p. 68 (Honolulu).—ALLEYNE and MACLEAY, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 339 (Bramble Bay).—GÜNTHER, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—KLUNZINGER, Fische Roth. Meer., 1884, p. 86.—DAY, Fauna Brit. India, vol. 2, 1889, p. 147.—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 427 (Ternate).—PELLEGRIN, Bull. Mus. Hist. nat. Paris, vol. 13, 1907, p. 203 (Tuléar, Madagascar); Bull. Soc. Zool. France, vol. 39, 1914, p. 227 (Mahambo, Madagascar).

Acanthurus unicornis JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 559 (Nagasaki; Honolulu).—EVERMANN and SEALE, Bull. Bur.

---

[8] κῦφος, hump; μυκτηρ, nose or snout.

Fish., vol. 26, 1906 (1907), p. 98 (San Fabian).—OGILBY, Mem. Queensland Mus., vol. 3, 1915, p. 135 (Dunk Island, Raine Island, Cape Moreton).

Monoceros unicornis SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).—?BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 781 (Mozambique).

Naso unicornis FOWLER, Copeia, No. 58, June 18, 1918, p. 64 (Philippines).—HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p 455, pl. 6, fig. 1, text fig. 2 (Tandubas, Bantayan, Bungau; Honolulu).

Monoceros biaculeatus SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 180. Arabia.

Monoceros raii SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 181. Locality? (on WILLOUGHBY).

Naso fronticornis LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pp. 104, 105, pl. 7, fig. 2. Red Sea.

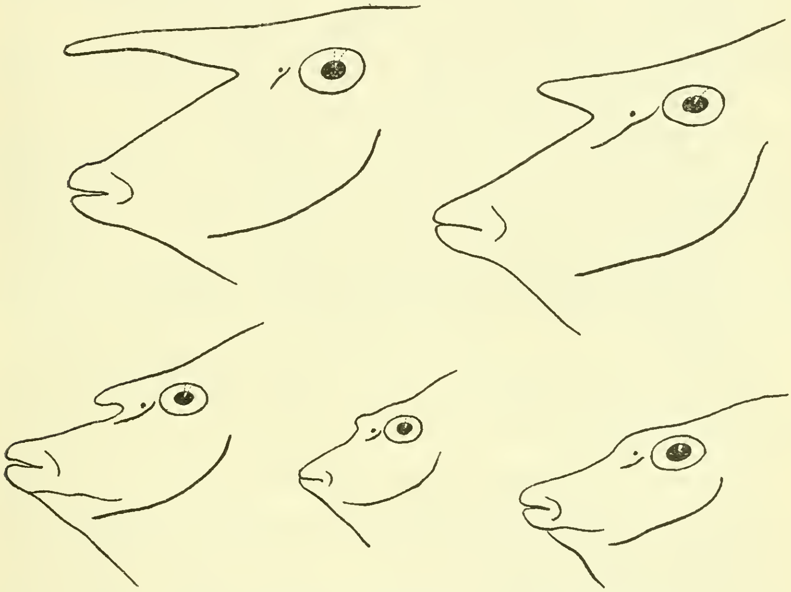

FIG. 16.—ROSTRAL VARIATION WITH AGE OF NASO UNICORNIS (FORSKÅL)

Naseus fronticornis VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 259 (Mauritius, Waigiu, Guam, Hawaii, Red Sea, Tahiti); Règne Animal Cuvier, Poiss., 1839, pl. 72, fig. 2.—SCHLEGEL, Fauna Japon., Poiss., dec. 7–9, 1845, p. 129, pl. 69 (Nagasaki).—RICHARDSON, Ichth. China Japan, 1846, p. 244 (China?, Hawaii).—BLEEKER, Verh. Batav. Genoot. (Nal. Ichth. Japan), vol. 25, 1853, p. 15; Nat. Tijds. Nederland. Indië, vol. 12, 1856, p. (230) 238 (Batu Island); GUICHENOT, Notes I. Réunion, vol. 2, 1862, p. 27.—BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 249 (Flores Island).

Keris anginosus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 304, pl. 295. No locality.

Priodon amginosus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. (457) 492 (Amboina).

Naseus anginosus BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); Nederland. Tijds. Dierk., vol. 1, 1863, p. 264 (Atapupu, Timor).

Naseus angiosus Bleeker, Nat. Tijds. Nederland. Indië, vol. 2, 1856, p. 487 (Ceram).

Naseus olivaceous Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 288. Tahiti.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 352 (Type; Philippines).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 533 (Luzon, Manila).

Chaetodon olivaceous (Solander) Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 288 (name in synonymy).

Naseus longicornis (Cuvier) Guérin, Iconogr. Poiss., 1830–44, pl. 35, fig. 3. Mauritius.

Harpurus monoceros (Forster) Lichtenstein, Descript. Animal., 1844, p. 219. Tahiti; Babuyoo near Waighew.

Keris amboinensis Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, pp. 272, 546. Amboina; Wahai.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (Tabukan, Sangi; Ternate).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125 (Amboina).

Priodon amboinensis Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 93 (Amboina); vol. 5, 1853, pp. 319, 320 (Amboina); vol. 6, 1854, p. 459 (Amboina); vol. 8, 1855, p. 393 (Amboina).

Naseus amboinensis Bleeker, Nat. Tijds. Nederland. Indië, vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 95 (Banda), p. 385 (Kajeli, Buru); vol. 13, 1857, p. 372 (Sangi), p. 478 (Karangbollong); vol. 15, 1858, p. 201 (Goram); vol. 17, 1858–59, p. 143 (Boleling, Bali); vol. 18, 1859, p. 354 (Bawean); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 31 (Manado); vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 12, 1861, p. 31 (Singapore).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 321 (Saleyer).

Acronurus aegyptius Gray, Cat. Fish. Gronow, vol. 2, 1854, p. 191. Red Sea.

Acronurus coringer Gray, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 192. Red Sea (on Forskål).

Naseus punikar Thiollière, Fauna Woodlark, 1857, p. 182. Woodlark Island.

Prionurus punikar (Montrouzier) Thiollière, Fauna Woodlark, 1857, p. 182 (name in synonymy).

Depth 1⅞ to 2⅖; head 3 to 3⅗, width 2 to 2⅓. Snout 1¼ to 1⅖ in head from snout tip; eye 2⅞ to 6, 2⅛ to 4⅗ in snout, 1 to 1⅔ in interorbital; teeth 46 to 38 in jaws, small, compressed moderately; maxillary 3⅖ to 4; interorbital 3⅛ to 3½, broadly convex. Gill rakers 4 + 9, short, clavate, robust.

Skin very finely asperous, finely velvety to touch; in young scales very small, slightly rougher.

D. VI, 27, i or 28, i, first spine 2 to 2½ in head, first ray 1¾ to 2¼; A. II, 27, i to 29, i, second spine 3 to 3⅛, first ray 2⅞ to 3⅛; caudal emarginate, hind edge nearly truncate with age, upper and lower tips produced in slender filaments nearly as long as head, 2¾ to 3¾ in combined head and body; least depth of caudal peduncle 5 to 5¾ in head; pectoral 1½; ventral 1⅞ to 2⅓; caudal peduncle with 2 bony bucklers, each with denticle flattened and curved forward, anterior usually larger or its base equals or slightly greater than eye; no bucklers in very young.

Largely uniform brownish, but slightly paler below. Iris brown. Fins all dull brown, dorsals and anals with longitudinal darker bands crossing rays and spines obliquely. Paired fins uniform brownish, hind ventral edge slightly paler.

Red Sea, Ceylon, East Indies, Philippines, China, Japan, Melanesia, Polynesia, Hawaii.

9284. Basot Island, Pocket Bay. June 11, 1909. Length 195 mm.

8951. Between Paron and Jesus Points, Luzon. June 21, 1909. Length 453 mm.

14900. Biri Channel. June 2, 1909. Length 110 mm.

7872, 7873, 9819. Cagayan, Sulu Island. January 8, 1909. Length 218 to 342 mm. Generally new olive green fading to davy's. Dorsal and anal tips purplish, perhaps blue in life; body of fin hyaline roman ocher, crossed by greenish gray oblique lines; on dorsal lines extend over 12 membranes; on anal almost parallel with edge. Caudal body color, some greenish-white in fork. Base probably yellowish in life. Fins with black spines, fading blue.

4925, 4926. Casogoran, Malhon Island. July 27, 1909. Length 193 to 207 mm.

5353. Cebu market, Cebu Island. April 4, 1908. Length 200 mm.

5418. Cebu market. April 7, 1908. Length 540 mm. No horn. Upper surface slate gray, lower white. Upper surface of caudal peduncle slate black, lower surface white. Dorsals like body, but more or less mottled with dusky. Anal spines and rays tipped with white, fin washed with yellowish basally and somewhat dusky terminally. Caudal like body color but paler, broadly tipped white in fork. Pectoral dusky, rays colorless. Ventral whitish, with slight yellowish wash and some dusky on inner rays.

[1843]. Cebu market. August 28, 1909. Length 134 mm.

6063 [433]. Dumaca River, Luzon. February 25, 1909. Length 163 mm.

7290. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 205 mm.

6362, 6366. Jolo, Jolo Island. March 7, 1908. Length 138 to 140 mm.

14497. Langao Point, Luzon. June 24, 1909. Length 190 mm.

5974. Little Santa Cruz Island. May 26, 1908. Length 250 mm.

8513. Makesi Island, Palawan. April 5, 1909. Length 315 mm.

9079, 9083, 9084. Malhon Island. July 27, 1909. Length 263 to 290 mm.

6162. Mansalay, Mindoro Island. June 4, 1908. Length 520 mm.

5446. Mantacao Island, Bohol. April 8, 1908. Length 518 mm.

14319, 15517. Palag Bay vicinity, Luzon. June 16, 1909. Length 150 to 195 mm.

15523. Pandanon Island. March 24, 1909. Length 50 to 194 mm. Five examples, small ones with pale ring around caudal peduncle.

5898, 5899. Polloc, Mindanao. May 22, 1908. Length 570 to 593 mm.

6379, 6380, 18872. Port Jamelo, Luzon. July 13, 1908. Length 175 to 320 mm.

7091 to 7095. Port San Pio Quinto, Camiguin Island. November 11, 1908. Length 225 to 595 mm.

7322. Sablayan Bay, Mindoro Island. December 12, 1908. Length 520 mm.

4889. Siasi, Jolo. February 17, 1908. Length 285 mm. Called "pugut." Above dingy olive, lower half of body dirty white. Narrow black line from above upper angle of gill slit opposite eye to behind pectoral base. Iris black near pupil, white terminally and upper section black. Teeth orange. Dorsals dull green at bases, blackish medially, margin white. Anal mottled dull green basally, blackish line submarginal and pure white marginal line. Caudal dull greenish brown, hind edge narrowly white. Pectoral pale green, free edge whitish. Ventral rays green.

10370. Subig, Lubang Island. July 14, 1908. Length 200 mm.

6441. Tilig Bay, Lubang. July 14, 1908. Length 260 mm. Brownish olive above, becoming yellowish below. Dorsal and anal olive yellow, margined with blue; anal with 4 interrupted cross bands of slate gray; dorsal similar, except bands much more broken, become almost an irregular mottling; spines with blue bases. Caudal with blue-gray shades. Paired fins similar to adjacent regions of body.

6481, 6482. Tilig, Lubang Island. July 15, 1908. Length 212 to 334 mm.

7661. Ulugan Bay, Palawan Island. December 28, 1908. Length 533 mm.

6930, 6979. West coast of Sabtan Island. November 8, 1908. Length 480 to 605 mm.

4451. Apra Bay, Guam. November 19–21, 1907. Length 530 mm.

A1461, A1462. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 455 to 565 mm.

A1557. Nan Wan, Formosa. January 25, 1910. Length 262 mm.

17976 U.S.N.M. Honolulu. Dr. T. H. Streets. Length 290 mm.

32734 U.S.N.M. Indian Archipelago. Leiden Museum. Length 74 mm. As *Naseus amboinensis.*

50792 U.S.N.M. Southern Japan. Imperial Museum, Japan. Length 107 mm.

52343 U.S.N.M. Samoa. Bureau of Fisheries. Length 246 to 350 mm. Two examples.

55105 U.S.N.M. Honolulu. *Albatross* collection. Length 134 to 147 mm. Two examples.

55429 U.S.N.M. Hilo, Hawaii, from dolphin's stomach. July 18, 1901. Bureau of Fisheries Length 30 to 34 mm. Four examples.

55483 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Length 150 to 393 mm. Four examples.

55970 U.S.N.M. San Fabian, Philippines. Bureau of Fisheries. Length 66 mm.

58518 U.S.N.M. Honolulu. E. L. Berndt. Length 70 mm.

59697 U.S.N.M. Matsúshima Bay, Japan. Dr. H. M. Smith. Length 80 mm.

71661 U.S.N.M. Nafa, Okinawa. *Albatross* collection 1906. Length 202 mm.

82907 U.S.N.M. Oahu. Wilkes Exploring Expedition. Length 73 mm.

NASO BRACHYCENTRON (Valenciennes)

Naseus brachycentron VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 275. Waigiu.

Naso brachycentron HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 448, pl. 5, fig. 2 (Bennett Island and Bantayan).

Frontal horn with axis passing through orbit. D. V, 29; A. II, 28. Gray. Length 512 mm. (Valenciennes.)

Apparently close to *Naso unicornis* but with very strong dorsal spines only half as long as in that species.

NASO BREVIROSTRIS (Valenciennes)

Naseus brevirostris VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 277. Moluccas; Mauritius; New Guinea.—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. (154) 165 (Macassar); vol. 9, 1855, p. (283) 306 (Macassar); Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 5, 1857–58, p. 2 (Macassar).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 349 (Ceylon, Malay Archipelago, Macassar, Amboina, Tana, Aneiteum).—GUICHENOT, Notes I. Réunion, vol. 2, 1862, p. 27.—PLAYFAIR, Fishes of Zanzibar, 1866, p. 58 (Zanzibar).—KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 511 (Koseir, Red

Sea).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 121, pl. 79, fig. A, text fig. 5 (Tahiti; Kingsmills).—Day, Fishes of India, pt. 2, 1876, p. 209, pl. 48. fig. 4.—Peters, Monatsber. Akad. Wiss. Berlin, 1876, p. 440 (Mauritius).—Schmeltz, Mus. Godeffroy Cat., No. 6, 1877, p. 15 (Zanzibar).—Klunzinger, Fische Roth. Meer., 1884, p. 86.—Boulenger, Proc. Zool. Soc. London, 1889, p. 239 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 146, fig. 55.—Vinciguerra, Spall. Giorn. Roma. Sci. Biol., vol. 19, No. 2, 1890, p. 486 (Zanzibar).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 321 (Saleyer).—Zugmayer, Abh. Bayer. Akad. Wiss., Math.-Phys. Kl., vol. 26, abth. 6, 1913, p. 12 (Oman).

Naso brevirostris Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 450, pl. 5, fig. 3 (Olongapo, Calapan, Bulalacao Bay, Romblon, Tablas, Sibuyan, Tagapula, Bantayan Zamboanga, Sitanki).

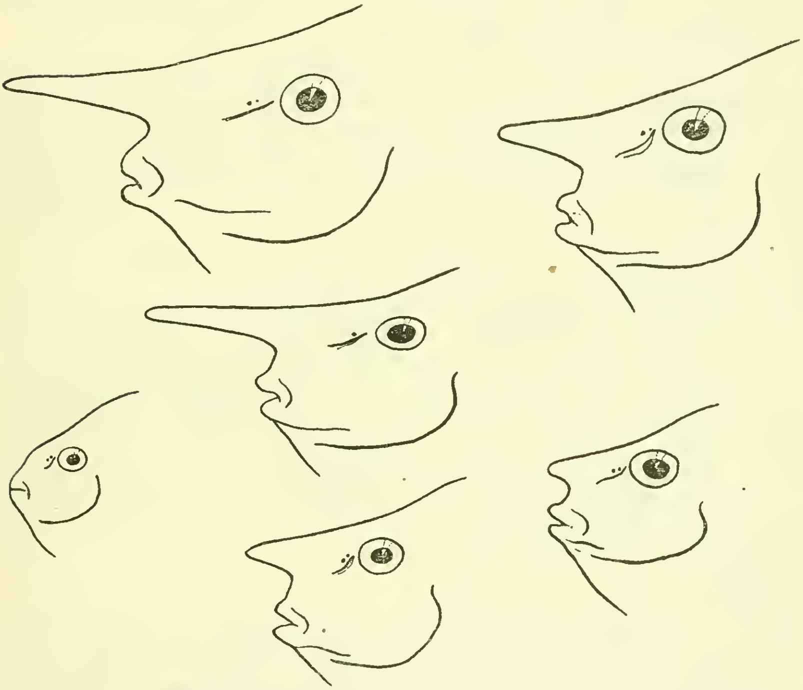

Fig. 17.—Rostral variation with age of Naso brevirostris (Valenciennes)

Naseus hoedtii Bleeker, Nat. Tijds. Nederland. Indië, vol. 5, 1853, p. (319) 339. Amboina; vol. 6, 1854, p. 457 (Amboina); vol. 8, 1855, p. 393 (Amboina).

Depth 2 to 2⅔; head 3⅗ to 4, width 1⅞ to 2⅖. Snout 1⅖ to 1⅗ in head from snout tip; eye 2⅗ to 4¼, 1¾ to 2⅞ in snout, 1 to 1⅔ in interorbital; teeth 46 to 54 in jaws, small, inconspicuous; maxillary 3 to 4⅓ in head; interorbital 2⅞ to 3⅓, broadly convex. Gill rakers 3 to 5+9, short, robust, conic tubercles.

Skin everywhere minutely asperous, asperities coarser in young.

D. V, 28, I to 29, I, first spine 1¾ to 2⅒ in head, first ray 2 to 2⅗; A. II, 28, I to 29, I, second spine 2¾ to 3½, first ray 3 to 3⅔; caudal little emarginate, nearly truncate with age, length to tip of upper lobe 1 to 1¼; least depth of caudal peduncle 4⅕ to 5¾; pectoral 1½ to 1⅗; ventral 1⅞ to 2¼; 2 caudal bucklers, each with large keel, front one larger and in adult 1½ in eye.

Largely uniform brown. Iris brown. Dorsals and anals dusky brown, each with submarginal deeper or more blackish band, edges of rayed fins narrowly whitish; anal with 2 deep dusky longitudinal bands besides border. Caudal deep brown, hind edge whitish, broader in young in which it extends forward a little along upper and lower edges. Pectoral rather deep brown, hind edge pale or whitish. Ventral dusky terminally, paler basally.

Red Sea, East Indies, Philippines, Melanesia, Micronesia, Polynesia.

Distinguished from *Naso unicornis* by the lower front basal edge of the rostrum falling close behind the front edge of the upper jaw, so well shown in Günther's figures. Our examples show a much greater range in variation so we have given the accompanying figures of the head.

8631, 8632. Biri Channel. June 1, 1909. Length 248 to 278 mm.

9942. Biri Channel. June 2, 1909. Length 140 mm.

7809, 7810, 7826, 7827. Bugsuk Island. January 5, 1909. Length 280 to 421 mm.

22919. Busin Harbor, Burias Island. April 22, 1908. Length 62 mm. (D. 5640). Anal with 5 or 6 dark longitudinal bands and both dorsals more or less unicolor except paler blotches along base. Hind caudal portions broadly pale.

7202. Cabugan, Hinunangan Bay, Leyte Island. July 30, 1909. Length 218 mm.

5550. Cataingan. April 19, 1908. Length 195 mm.

7744. Caxisigan Island, near Balabac. January 2, 1909. Vertical fins blackish at tips, extreme margin white. Dorsal without bars. Anal with 3 or 4 slightly oblique bars. Length 282 mm.

[1843, 1844.] Cebu market. August 28, 1908. Length 123 to 127 mm. Two examples.

6365. Jolo, Jolo Island. March 7, 1908. Length 165 mm.

4795, 4796. Jolo market. February 8, 1908. Hair-brown generally, slightly darker on back and shading to dirty mottling on white below. Dorsal darker marginally, extreme tip with narrow white line, almost black submarginally. Anal sage green, with 3 darker irregular bands, broadest near margin and edge of fin narrowly white. Caudal like body, darker terminally, white edge broadens at tips of lobes. Pectoral darker on inner surface and terminally, tip hyaline, ventral membrane dark, rays light. Length 303 to 397 mm.

5975, 9825. Little Santa Cruz, Zamboanga. May 26, 1908. Length 185 to 203 mm.

9080. Malhon Island. July 27, 1909. Length 320 mm.

Eight examples. Pandanon Island. March 24, 1909. Caudal broadly and dorsal and anal more narrowly white edged. Length 50 to 68 mm.

22190. Pangasinan Island. February 13, 1908. Length 116 mm.

7797. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 295 mm.

8950. Between Paron and Jesus Points, Luzon. June 2, 1908. Length 346 mm

7699. Ulugan Bay near Rita Island. December 29, 1908. Length 428 mm.

7370. Tara Island. December 15, 1908. Length 240 mm.
A1555. Nan Wan, Kwaling Bay, Formosa. January 25, 1910. Length 278 mm.
26568 U.S.N.M. Puako Bay, Hawaii, 1901–2. *Albatross* collection. Length 228 mm.
52672 U.S.N.M. Puako Bay, 1901–2. *Albatross* collection. Length 288 mm.
55017 U.S.N.M. Honolulu. *Albatross* collection. Length 178 mm.
65702 U.S.N.M. Hawaii. *Albatross* collection, 1899–1900. Length 216 mm.
65720 U.S.N.M. Rangiroa, Paumotus. Bureau of Fisheries. *Albatross* Collection, 1910. Length 298 mm.
71558 U.S.N.M. Nafa, Okinawa. *Albatross* collection, 1906. Length 188 mm.

NASO ANNULATUS (Quoy and Gaimard)

Priodon annulatus Quoy and Gaimard, Voy. Uranie, Zool., January 29–May 26, 1925, p. 377. Timor.

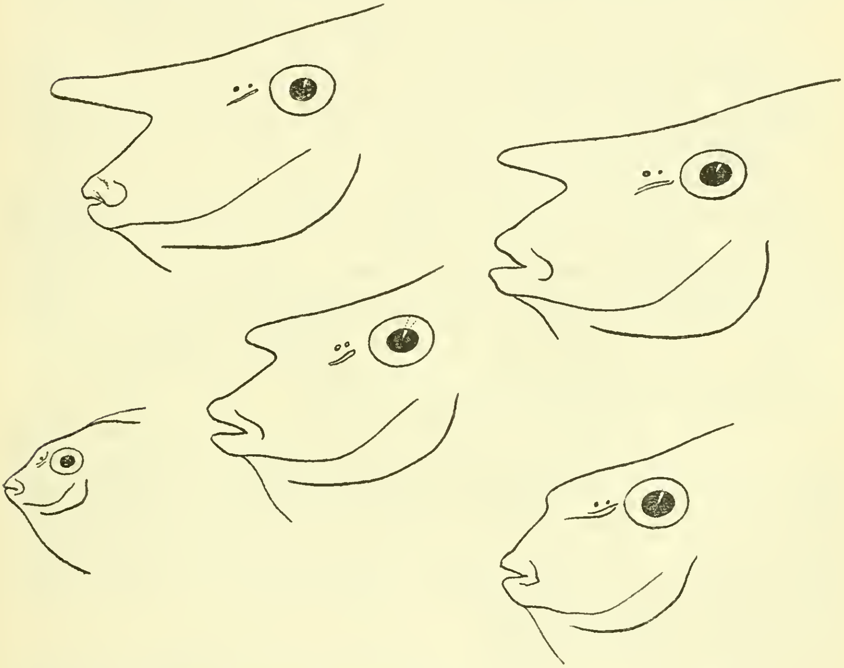

Fig. 18.—Rostral variation with age of Naso annulatus (Quoy and Gaimard)

Naseus annulatus Bleeker, Nat. Tijds. Ned. Indië, vol. 9, 1855, p. (283) 304 (Macassar); vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 95 (Banda), p. 385 (Kajeli, Buru); vol. 12, 1856, p. 230 (Batu Island); vol. 13, 1857 p. 56 (Kajeli, Buru); vol. 15, 1858, p. 201(Goram Island); vol. 19, 1859, p. 331 (Pajitan, Java); vol. 20, 1859–60, p. 206 (Boleling, Bali); Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 5, 1857–58, p. 2 (Macassar).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 352 (Aneiteum).—Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 271 (Atapupu, Timor).—Alleyne and Macleay, Proc. Linn. Soc. New South Wales, vol. 1, 1876, p. 339 (Cape Grenville).—Klunzinger, Fische Roth. Meer., 1884, p. 87.

Naso annulatus Fowler, Proc. Acad. Nat. Sci. Phila., 1927, p. 287 (Philippines).

Acanthurus annulatus Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).

Acanthurus annulatus Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 57 (Cebu).

Naseus marginatus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 280. Tongatabou, Friendly Islands.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 333 (copied); Journ. Mus. Godeffroy, vol. 4, 1875, p. 122, pl. 83 (Pelew Islands, Aneiteum, Fiji).

Naso marginatus Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 452, pl. 6, fig. 2, text fig. 1 (Calapan, Zamboanga, Jolo, Bungau, Sitanki, Gato).

Acanthurus marginatus Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).

Priodon annularis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 302, pl. 294 (on Quoy and Gaimard).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 93 (Amboina); vol. 8, 1855, p. 306 (Batoe Island).

Prionodon annularis Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. (546) 558 (Amboina).

Acanthurus incipiens Jenkins, Bull. U. S. Fish Comm., vol. 22, 1902 (1903), p. 480, fig. 32. Honolulu.—Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 357 (Apia, Samoa).

Depth 2⅛ to 2⅘; head 3⅔ to 4⅔, width 1⅞ to 2⅛. Snout 1⅗ to 1⅔ in head from snout tip; eye 2⅔ to 5, 1⅘ to 3 in snout, 1 to 1⅔ in interorbital; teeth 54 to 45 in jaws, very small and inconspicuous; maxillary 3⅞ to 4⅘ in head; interorbital 2⅞ to 3, convexly elevated. Gill rakers 5+10, short, robust, conic tubercles.

Skin everywhere minutely asperous, nearly smooth or finely velvety to touch; in young more rough velvet.

D. VII, 26, I to 28, I, last spine 1¾ to 2 in head, tenth ray 1⅘ to 2⅓; A. II, 27, I or 28, I, second spine 2¾ to 3⅓, tenth ray 1⅕ to 2½; caudal slightly emarginate in young, becoming broadly expanded and convex behind with age, 1 to 1½; least depth of caudal peduncle 4⅔ to 5⅓; pectoral 1⅓ to 1⅖; ventral 1⅔ to 1⅘; caudal with 2 bony bucklers, anterior little larger or base longer than eye, not present in our youngest example.

Deep slaty brown generally, with gray tinge in fresher examples. Side with many short, dusky or bluish transverse parallel lines. Iris dusky. All along upper and lower boundaries of body and over most of head many rather close-set deep brown spots, paler on lower surfaces. Dorsal and anal uniform dusky brown. Caudal largely pale brown, base dusky. Paired fins brown.

Mauritius, Ceylon, East Indies, Philippines, Micronesia, Polynesia, Hawaii. The adult very strongly resembles *Naso eoume*, but may easily be distinguished by its well-developed rostral protuberance and the caudal fin without any filaments. Even the very young usually show the little prominence midway on the front profile of the snout.

7462. Bolalo Bay. December 21, 1908. Length 283 mm.

7201. Cabugan Island, Hinunangan Bay, Leyte. July 30, 1909. Length 196 mm.

7797. Caxisigan Island, Balabac. January 3, 1909. Length 310 mm.

8458 to 8460. Cagayanes Island. March 31, 1909. Length 300 to 349 mm. Three examples.

6524. Cebu market. April 5, 1908. Length 182 mm.

[1844]. Cebu market. August 23, 1909. Length 120 mm.

7436, 14333. Dalaganem Island. April 8, 1909. Length 163 to 170 mm. Two examples.

7502, 7503. Endeavor Strait, Malampaya Sound, Palawan. December 22, 1908. Length 264 to 266 mm. Slaty above, becoming drab below. Lower side with numerous broken and undulating darker bars. Opercle edge whitish. Dorsal and anal body color, with narrow bright blue margin fading to ground color of fins shortly after death. Caudal pale, yellowish at tip, more pronounced as an inframarginal stripe.

7604. Endeavor Strait. December 24, 1908. Length 235 mm.

8231. Galvaney Island, Ragay Gulf. March 9, 1909. Length 450 mm. Marks purplish, ground color smoky purple. Broad purple blotch in front of eye and pectoral base. Dorsal translucent, cloudy, margin yellow. Edges of dorsal, anal and caudal filaments purple. Anal axil purplish on base.

14432. Gubat, Sorsogon, Luzon. June 23, 1909. Length 150 mm.

6355. Inamucan Bay, Mindanao. August 8, 1909. Length 165 mm.

22811, 22812. Jolo. March 6–7, 1908. Length 120 to 122 mm.

6361, 6367, 6369. Jolo Island. March 7, 1908. Length 115 to 140 mm.

9285. Murcielagos Bay, Mindanao. August 9, 1909. Length 210 mm.

9345. Same locality. August 20, 1909. Length 225 mm.

8353. Same locality. August 21, 1909. Length 180 mm.

5901. Polloc, Mindanao. May 22, 1908. Length 220 mm.

A736. Danawan Island. September 27, 1909. Length 300 mm.

A953. Sadaa Island. November 17, 1909. Length 513 mm.

14681. Langao Point, Luzon. June 24, 1909. Length 165 mm.

2190 (D. 5329). November 19, 1908. Length 118 mm.

52520 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 137 mm. As *Acanthurus incipiens*.

84230 U.S.N.M. Cebu, Philippines. Length 245 mm.

50707 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Type of *Acanthurus incipiens*.

Subgenus CYPHOMYCTER Fowler and Bean

Type.—*Naso tuberosus* Lacépède.

Diagnosis.—Differs from subgenus *Naso* Lacépède in the convex and crestlike hump placed above the snout in the adult.

Indo-Pacific. Two species, *Naso tuberosus* and *Naso eoume*.

NASO TUBEROSUS Lacépède

Naso tuberosus LACÉPÈDE, Hist. Nat. Poiss., vol. 3, 1802, pp. 105, 111, pl. 7, fig. 3. No locality (on COMMERSON).

Naseus tuberosus BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 249 (Flores Island).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 353 (Ceylon).—PLAYFAIR, Fishes of Zanzibar, 1866, p. 58 (Zanzibar).—GÜNTHER, Journ. Mus. Godeffroy, vol. 4, 1875, p. 123, pl. 8 (Zanzibar, Mauritius, Aneiteum).—PETERS, Monatsber. Akad. Wiss. Berlin, 1876,

p. 440) Mauritius).—Day, Fishes of India, pt. 2, 1876, p. 208.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 24 (North Celebes; Kordo, Mysore).—Day, Fauna Brit. India, vol. 2, 1889, p. 146.

Naseus tuber Guichenot, Notes I. Réunion, vol. 2, 1862, p. 27.

Naso tuberosus Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 458 (no examples).

Acanthurus tuberosus Jordan and Seale, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).—Ogilby, Mem. Queensland Mus., vol. 3, 1915, p. 135 (Raine Island).

Monoceros tuberosus Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 510 (Okinawa).

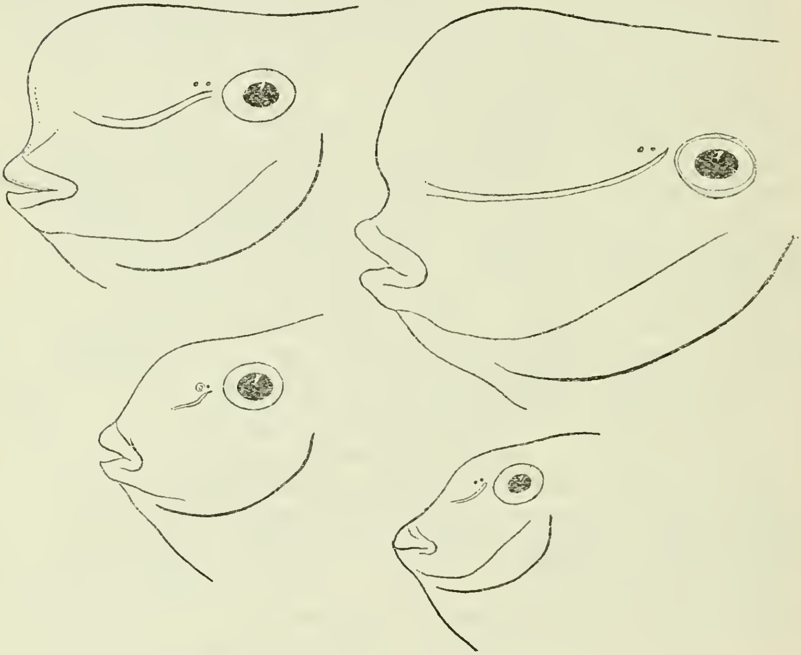

Fig. 19.—Rostral variation with age of Naso tuberosus Lacépède

Aspisurus carolinarum Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 375, pl. 63, fig. 1. Carolines; Guam.

Naseus tonganus (Quoy and Gaimard) Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 292. Tongatabou.

Naseus punctulatus Steindachner, Sitz. Ber. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 70, Heft 1, 1874, p. 386, pl. 1 (Mauritius).

Depth $2\frac{1}{4}$ to $2\frac{3}{4}$; head $3\frac{3}{5}$ to 4, width $1\frac{7}{8}$ to $2\frac{1}{10}$. Snout $1\frac{1}{3}$ to $1\frac{2}{5}$ in head from snout tip; eye $3\frac{1}{5}$ to $5\frac{1}{3}$, $2\frac{1}{4}$ to $4\frac{1}{8}$ in snout, $1\frac{1}{8}$ to 2 in interorbital; teeth 40 to 42 in each jaw, 30 to 34 in young, compressed, pointed, minutely serrated; maxillary $3\frac{1}{2}$ to $3\frac{7}{8}$ in head; interorbital $2\frac{7}{8}$ to 3, broadly convex. Gill rakers 4 + 7, short, robust, conic.

Skin minutely asperous, rough velvety to touch; asperities little coarser in young.

D. V, 27, I to 29, I, first spine 2 to 6 in head, first ray 2½ to 3; A. II, 26, I or 27, I, second spine 3¼ to 5, first ray 3½ to 3⅞; caudal deeply emarginate in young, only very slightly so or hind caudal edge nearly truncate with age, 1⅛ to 1⅕; least depth of caudal peduncle 5 to 5¼; pectoral 1⅔ to 1¾; ventral 1¾ to 2¾; caudal peduncle with 2 bony bucklers, each with broad, strongly compressed, recurved spine, base of anterior 4 to 7¾.

Olivaceous brown on back, paler or quite light below. Back and upper side covered with slightly darker, small, round spots, each greatly less than pupil and of more or less similar size, these also extend over head in some examples. Iris brown. Dorsals and anals dark brown, broadly margined whitish, each with 2 longitudinal rows of dark to blackish-brown spots in dark area of each membrane. Caudal brown, becomes dusky submarginally with narrow white border and dark subterminal area with obscure scattered dark small spots, less distinct or absent with age. Pectoral brown, becoming neutral dusky submarginally and edge broadly whitish, narrowly so with age. Ventral pale to whitish, with several brown spots.

Zanzibar, Mauritius, Ceylon, East Indies, Philippines, Queensland, Melanesia, Polynesia, Hawaii. In old examples, in addition to the rostral hump, a hump behind the spinous dorsal hump about opposite end of pectoral in vertical.

8934. Atulayan Island, Luzon Gulf. June 18, 1909. Length 367 mm.

9283. Basot Island, Pocket Bay. June 11, 1909. Length 203 mm.

8556. Bolinao. May 10, 1909. Length 558 mm.

7203. Cabugan, Hinunangan Bay, Leyte. July 30, 1909. Length 208 mm.

8768. Lahuy Island. June 11, 1909. Length 245 mm.

9030. Langao Point, Luzon. June 24, 1909. Length 267 mm.

8841. Maculabo Island. June 14, 1909. Length 285 mm.

9081, 9082. Malhon Island. July 27, 1909. Length 227 to 320 mm.

8594, 8599. Matnog Bay. May 31, 1909. Length 250 to 353 mm.

8755, 8756. Parangpong Island. June 10, 1909. Length 358 to 426 mm.

7090. Port San Pio Quinto. November 11, 1908. Length 560 mm.

8779. Quinalasag Island. June 12, 1909. Length 275 mm.

6901. Santo Domingo, Batan. November 7, 1908. Length 560 mm.

30545 U.S.N.M. New Guinea. Australian Museum. Length 208 mm.

43940 U.S.N.M. Mauritius. Col. Nicholas Pike. Length 230 to 320 mm. Three examples.

NASO EOUME (Lesson)

Prionurus eoume Lesson, Voy. Coquille, Zool., vol. 2, pt. 1, 1830, p. 151. Matavai Bay, Tahiti.

Naseus vlamingii Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 293. Moluccas.—Bleeker, Nat. Tijds. Nederland Indië, vol. 4, 1853, p. 472 (Batavia); vol. 18, 1859, p. 354 (Bawean); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 9 (Macassar).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 123, pl. 81 (Bonham Island, Aneiteum, Ebon Island, Ceram).—Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, 1896, p. 315

(off Minnikoy Island, Laccadives).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 320 (Nusa Laut).

Naso vlamingii Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 459, pl. 15, fig. 1 (Puerto Galera, Sibuyan, Culion, Zarboanga, Sibutu).

Naseus tuberosus (not Lacépède) Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 353 (Ceram, Aneiteum).

Depth 2⅕ to 2⅗; head 3½ to 4⅛, width 1⅞ to 2. Snout 1⅖ to 1⅔ in head from snout tip; eye 3⅛ to 4⅗, 2 to 2⅞ in snout, 1⅛ to 1½ in interorbital; teeth 50 to 55 in each jaw, 33 to 35 in young; maxillary 4⅕ to 4⅔ in head; interorbital 3 to 3⅒, convexly elevated; rostrum rounded protuberance, not extended or only very slightly before front of jaws. Gill rakers 3 + 9, short cuneate points.

Skin minutely asperous, slightly larger granules over preorbital.

D. VI, 26 or 27, sixth spine 1⅖ to 2 in head, sixth ray 1⅛ to 2¼; A. II, 27 or 28, second spine 2½ to 3, fifth ray 1⅔ to 1⅞; caudal truncate or hind edge slightly convex, fin 1 to 1⅘, upper and lower points produced with age, nearly or quite ⅓ combined head and body; least depth of caudal peduncle 5⅓ to 6 in head; pectoral 1⅕ to 1⅓; ventral 1⅓ to 1¾.

Deep umber brown generally; head posteriorly finely spotted with dusky, gray-blue when fresh. Also upper portion of back, breast and belly more thickly spotted with gray-blue, spots much smaller and more crowded and numerous below. Entire sides of body and tail with very numerous, close-set, vertical gray-blue lines, many broken or connected to form brown or dark bars and lines on tail, where greatly numerous. Caudal and paired fins uniform brown. Dark line from gill opening close below pectoral base, above which spots not extending. Another similar dark line along and below lower eye edge. Dorsals and anals dusky brown. Iris yellowish brown.

East Indies, Melanesia, Polynesia, Hawaii. The peculiar type of coloration, the long caudal filaments and obtusely rounded front or snout easily distinguish this species. In the young the trunk and tail are entirely spotted with dark and the anal with 1 or 2 longitudinal dark or deep brown bands within outer half.

4958. Alibijaban Island. March 6, 1909. Length 382 mm. without caudal filaments.

A502. Balukbaluk Island. September 12, 1909. Length 315 mm.

9942, 14507, 21130. Biri Channel. June 2, 1909. Length 147 to 168 mm.

5371, 5374. Cebu market. April 5, 1908. Length 250 to 320 mm.

9072. Casogoran, Malhon Island. July 27, 1909. Length 293 mm. General color slaty or steel gray, with slight lavender shade on breast and belly. Side of head and back with numerous prussian-blue spots which dull purplish after exposure to air; fuse along side into undulating bars. Area below pectorals and lower side of abdomen along anal base spotted. Bright blue or purple bands from above snout tip backwards under eye and upwards on postocular. Purplish on lips, about gill opening and pectoral base. Dorsal brownish, purplish margin becoming slaty. Anal like dorsal only slightly paler, broken band along base becoming bluish. Caudal more or less olive terminally.

Pectoral rays dull violet black, membranes partly hyaline. Ventral pale brown or olive.

8234. Galvaney Island, Ragay Gulf. March 9, 1909. Length 378 mm. Olive gray, with narrow brownish vertical stripes breaking into dots below. Belly pale, purplish on upper breast. Stripes on lower head. Opercular flap white. Dorsal and anal purplish on edge, few blotches below. Caudal whitish.

14430, 14431. Gubat, Sorsogon, Luzon. June 23, 1909. Length 145 to 150 mm.

4714, 4715. Ligpo Point, Balayan Bay. January 18, 1908. Length 287 to 320 mm. Ground color dark olive-green, becoming lighter below. Back profusely dotted with minute, rounded, sapphire spots elongated toward long axis and changing to vertical lines along sides. Minute spots of less vivid sapphire on belly. Head lighter green, with sapphire spots. Sapphire line under eye extending through nostrils on to snout. Lips sapphire. Blue line on back at base of dorsal. Blue line extending along breast below gill margin becoming wider at pectoral base and extends around pectoral. Brilliant purple spot at caudal peduncle junction.

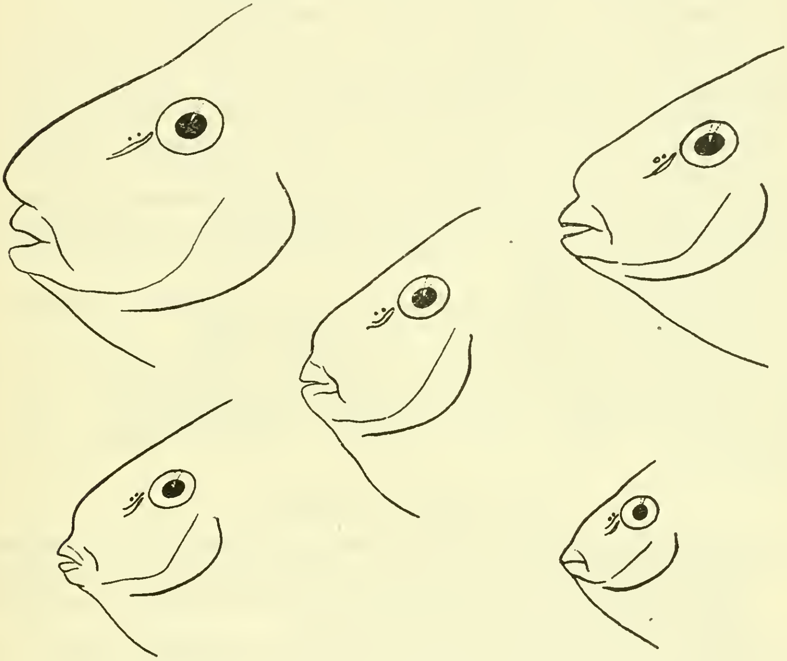

FIG. 20.—ROSTRAL VARIATION WITH AGE OF NASO EOUME (LESSON)

6062. Little Santa Cruz Island. May 28, 1908. Length 275 mm.

9343, 9344. Murcielagos Bay, Mindanao. August 21, 1909. Length 208 to 315 mm. Three examples.

8390 to 8392. Port Dupon, Leyte. March 17, 1909. Length 300 to 474 mm.

14683. Langao Point, Luzon. June 24, 1909. Length 144 mm.

19548. Simaluc Island. September 22, 1909. Length 168 mm. [1988].

A612. Singaan Island. September 21, 1909. Length 225 mm.

4958, 4967, 19831. Tataan Island, Tawi Tawi Group. February 20–21, 1908. Length 182 to 460 mm. General color purplish slate, above marked with many rounded purple dots about size of 9 or 10 shot; on middle of sides dots fuse as vertical waved lines, break into dots on upper part of breast and abdominal region, become extremely minute and then disappear. From shoulder around gill opening purplish, breaking into clouded area around pectoral and forming large blotch below middle of pectoral. Another purplish stripe, ⅔ width of eye, begins below eye, extends from front of eye to projected snout. Lips purple. Side of head with scattered dots same as body. Iris dark. Dorsals dark purplish olive, edged blue. Anal like soft dorsal, marginal bands somewhat broader and with dash of purple at bases of membranes. Caudal dark olive-green, with purplish shades; caudal peduncle at base bright purple, edges of fin lobes and produced rays dull purple; yellowish-green blotches under produced rays near outer angles of fin. Pectoral slaty, with dashes of brilliant purple on rays. Ventral dark yellowish-green.

16469. Teomabal Island. September 18, 1909. Length 168 mm.

A735. Danawan Island. September 27, 1909. Length 243 mm.

22858. Gomomo Island. December 3, 1909. Length 170 mm.

22918. Kalono Point. December 14, 1909. Length 58 mm. Without trace of hump on snout. Hind caudal edge narrowly white, within median caudal rays. Dorsals dark green, line of blue spots along front half of base and few blue spots on membrane especially anteriorly; irregular yellow-green mottlings on terminal third; narrow margin dark blue. Anals like dorsals; line of blue spots at base of membrane and margin narrowly blackish-blue. Caudal very dark olive-green, produced tips black; white area immediately anterior to bases of caudal filaments. Pectoral dusky purplish above, and bluish reflections below, border colorless. Ventral light reddish-brown, rays white basally. Vent in dirty white region.

A741, A742. Sipadan Island. September 28, 1909. Length 525 to 540 mm.

A952. Sadaa Island. November 17, 1909. Length 420 mm.

A1460. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 446 mm.

A904. Limbe Strait, Celebes. November 10, 1909. Length 315 mm.

A1551. Nan Wan, Formosa. January 25, 1910. Length 230 mm.

65721 U.S.N.M. Rangiroa. *Albatross* collection. Length 378 mm. to hind caudal edge.

NASO LITURATUS (Schneider)

Acanthurus lituratus Schneider, Syst. Ichth. Bloch, 1801, p. 216. No locality (on Forster).—Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).—Fowler and Ball, Bishop Mus. Bull., No. 26, 1925 (1926), p. 19 (Johnston and Wake Islands).

Harpurus lituratus (Forster) Schneider, Syst. Ichth. Bloch, 1801, p. 216 (name in synonymy).

Naseus lituratus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 282 (Tahiti, New Ireland, Ulea, Gulf of Suez, Red Sea, Mauritius).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. (740) 763 (Macassar); vol. 8, 1855, p. 306 (Batoe Island); vol. 13, 1857, p. 372 (Sangi Island); vol. 17, 1858–59, p. 130 (Atapoepoe, Timor).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 353 (type, Aneiteum, Malay Archipelago, Red Sea).—Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 249 (Flores Island), p. 271 (Atapupu, Timor).—Kner, Reise Novara, Fische, 1865, p. 213 (Australia).—Playfair, Fishes of Zanzibar, 1866, p. 58 (Zanzibar, Pemba Island).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 513 (Koseir, Red Sea).—Günther, Journ. Mus. Godeffroy, vol. 4, 1875, p. 124, pl. 82 (Red Sea, East Africa, Hawaii, Society Islands).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 320 (Karakaralong Island, Gisser, Timor).

Naseus (*Aspisurus*) *lituratus* Klunzinger, Fische Roth. Meer., 1884, p. 87.

Naso lituratus Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 464, pl. 16, fig. 1 (Olongapo, Balayan Bay, Bulalacao Bay, Elefante, Tablas, Ibahay, Bantayan, Manila, Sibuyan; Guam).

Aspisurus elegans Rüppell, Atlas Reise nördl. Afr. Fische, 1828, p. 61, pl. 16, fig. 2. Northern Red Sea.

Monoceros ecornis (Ehrenberg) Rüppell, Atlas Reise nördl. Afr. Fische, 1828, p. 61 (name in synonymy).

Monoceros garrettii Seale, Occas. Papers Bishop Mus., vol. 1, No. 3, 1900, p. 112. Guam.

Depth 2⅖ to 3⅛; head 3⅗ to 3¾, width 2 to 2⅕. Snout 1⅓ to 1⅖ in head from snout tip; eye 3½ to 5, 2⅕ to 3⅞ in snout, 1 to 1⅔ in interorbital; teeth 32 to 34, 26 to 28 in young, compressed, ends rounded; maxillary 3½ to 4¼ in head; interorbital 3⅓ to 3⅗, broadly convex. Gill rakers 4 + 9, compressed, short, triangular.

Skin finely roughened or asperous, rough velvety to touch; young also finely asperous.

D. VI, 28, i or 29, i, first spine 1⅞ to 2⅛ in head, first ray 2⅗ to 2¾; A. II, 28, i to 30, i, second spine 3 to 3½, first ray 3⅛ to 4; caudal emarginate, in young upper lobe little longer, with age uppermost and lowermost rays end in filament above and below, 1⅔ to 3⅔ in combined head and body; least depth of caudal peduncle 4⅔ to 5 in head; pectoral 1⅖ to 1½; ventral 1⅗ to 2; caudal peduncle with 2 bony bucklers, each with compressed, curved, broad, pointed spine directed forward, base of first buckler 5 to 8.

Dull uniform brown, scarcely paler below. Yellow line from lower eye edge forward, then down behind maxillary and upward along lower edge of preopercle. Iris brown, with yellowish ring around pupil. Bucklers pale yellowish. Dorsals and anals neutral blackish, each with buff border, upper more brilliant and lower or anal border broader. Caudal brown like body, hind edge whitish. Paired fins largely dull brown or with olivaceous tinge on pectoral.

Red Sea, East Africa, Mauritius, East Indies, Philippines, Melanesia, Micronesia, Polynesia, Hawaii. A very well marked species, easily distinguished by the absence of a frontal horn or hump and its variegated or rather brilliant colors.

8119, 16067. Alimango Bay, Burias Island. March 5, 1909. Length 157 to 368 mm.

8633. Biri Channel. June 1, 1909. Length 237 mm.

8725. Caracaran, Batan Island. June 8, 1909. Length 264 mm.

5377. Cebu market. April 5, 1908. Length 159 mm. Body and head dull blackish-green, lighter on belly. Area of oil green over and behind eye. Lips dull carmine. Two round orange spots on caudal peduncle. Light blue along back at base of dorsal. Dorsal jet black, color gradually shallower until at last rays involving half of fin, anteriorly extending entire depth; median narrow gray line, terminal zone buff and very narrow black edge. Anal olive at base, then broad poppy red band which dusky basally and narrow dark blue marginal line, also with very narrow marginal line of pale blue. Caudal black, with submarginal rich olive crescent and white marginal zone. Pectoral black, with large central olive green areas. Ventral rays olive, membranes blackish.

8230. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 318 mm.
14433. Gubat, Sorsogon, Luzon. June 23, 1909. Length 120 mm.
9016. Langao Point, Luzon. Length 247 mm.
6160, 6161. Mansalay, Mimdoro. June 4, 1908. Length 205 to 320 mm.
15063. Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 175 mm.
7241. Masinloc Bay, Zambales. November 22, 1908. Length 230 mm.
6258, 6260. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 265 to 388 mm.
8888. Palapag Bay vicinity, Luzon. June 16, 1909. Length 355 mm.
8735. Point Agojo, Catanduanes Island. June 10, 1909. Length 275 mm.
7381. Port Caltom, Busuanga Island. December 15, 1908. Length 352 mm.
7314. Sablayan Bay, Mindoro. December 12, 1908. Length 250 mm.
6442, 6443. Tilig, Lubang. July 14, 1908. Length 205 to 228 mm.
7174. West coast of Palaui Island. November 18, 1908. Length 208 mm. Yellowish stripe across preorbital from eye. Lips orange. Terminal half of soft dorsal white or hyaline, running somewhat into spinous, whole fin very narrowly margined with dark. Anal and caudal spines orange at base. Anal with narrow dark edge and dark base. Caudal like body color, with white tip and yellowish bar below, divided by dark again and forked. Paired fins more or less brassy.
A737. Danawan Island. September 27, 1909. Length 277 mm.
A1144. Kayoa Island. November 29, 1909. Length 216 mm.
26812 U.S.N.M. Johnston Island. Length 300 mm. to end of caudal filament.
52450 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 70 to 258 mm. Four examples.
52694 U.S.N.M. Hawaiian Islands. Length 355 mm.
84073 U.S.N.M. Hawaiian Islands. Length 136 mm.

NASO HEXACANTHUS (Bleeker)

Priodon hexacanthus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 8, 1855, p. (393) 421. Amboina.

Naseus hexacanthus GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 355 (copied).—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 427 (Batjan).

Naso hexacanthus HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 463, pl. 7, fig. 1 (Mariveles, Bantayan, Cuyo, Zamboanga).

Callicanthus metoposophron JENKINS, Bull. U. S. Fish. Comm., vol. 22, 1902 (1903), p. 481, fig. 31 (Honolulu).—JORDAN and EVERMANN, Bull. U. S. Fish. Comm., vol. 23, pt. 1, 1903 (1905), p. 405, fig. 178 (Honolulu).

Acanthurus metoprosophron FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 13 (Guam).

Acanthurus tuberosus (not LACÉPÈDE) FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 28 (Honolulu).

Depth 1⅞ to 3; head 3½ to 4⅓, width 1⅞ to 2. Snout 1¾ to 1⅘ in head; eye 2¾ to 3¾, 1⅘ to 3½ in snout, 1 to 1⅞ in interorbital; teeth 60 to 64 in each jaw, slender, little compressed, pointed, in young about 24 to 28 in jaws; maxillary 3⅘ to 5⅛ in head; interorbital 2⅞ to 3, convexly elevated. Gill rakers 4 + 10, fleshy, broad, short.

Body minutely asperous, velvety to touch; young with larger asperities, velvety.

D. VI, 27, I or 28, I, first spine 1½ to 2 in head, first ray 1⅔ to 2¼; A. II, 27, I to 29, I, second spine 3 to 3⅘, first ray 2⅛ to 3⅛; caudal moderately emarginate, becomes slightly lunate with age, old examples with hind edge nearly truncate, 3¾ to 3⅘ in combined head and body, to tip of upper lobe $1\frac{1}{10}$ to 1⅛ in head; least depth of caudal peduncle 4 to 6¼; pectoral 1⅕ to 1½; ventral 1¼ to 2¼; caudal peduncle with 2 bucklers, each with compressed denticle and though posterior denticle better developed anterior with longer base or 1 to 1⅗ in eye; young without bucklers.

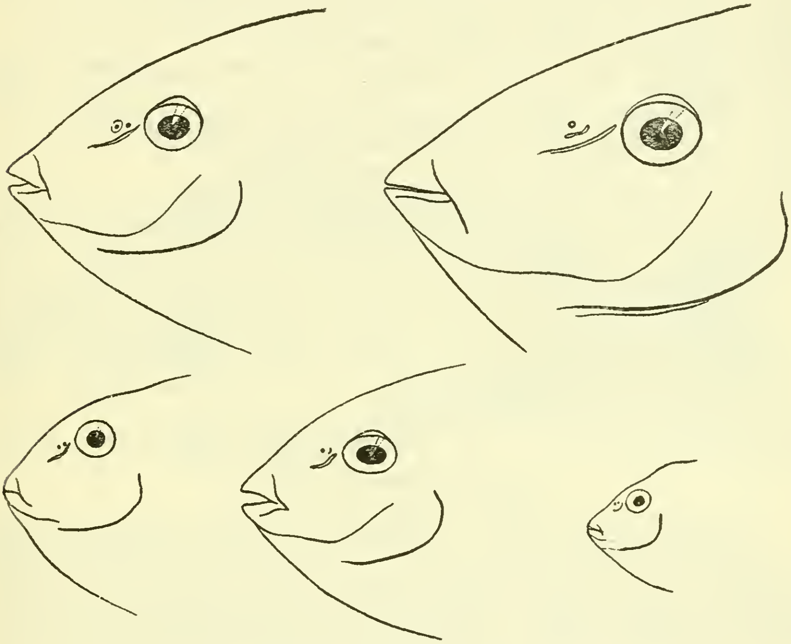

FIG. 21.—ROSTRAL VARIATION WITH AGE OF NASO HEXACANTHUS (BLEEKER)

Dull brown, slightly paler below sometimes, mostly uniform. Iris brown. Dorsals deep brown to dusky or even blackish brown; smaller examples with soft dorsal having 4 longitudinal blackish bands, fins with age clouded to uniformly dark brown. Anals uniform dusky and edges like dorsals, dark. Caudal and paired fins brown.

Under the microscope the young show the teeth serrate. In the adult they are inconspicuous, though present and much less developed. In this connection we have carefully compared the type of *Callicanthus metoposophron* in the National Museum and feel certain it is the younger stage of the present species. The teeth show distinct, though weak serrations, as in all our other specimens.

A501. Balukbaluk Island. September 12, 1909. Length 315 mm. Uniform slaty above, becoming white with slight olive wash below. Tips of soft dorsal rays pale, body of fin olive with irregular pale bars. Anal similar, markings less distinct and edge like that of dorsal or dark with submarginal pale. Caudal uniform purple slate.

14982. Calangaman Island. March 16, 1909. Length 250 mm.

18829. Cebu market. March 27, 1909. Length 90 mm.

11620. Endeavor Strait. December 24, 1908. Length 215 mm.

8233. Galvaney Island, Ragay Gulf. March 9, 1909. Length 500 mm. Smoky purple above, olive yellow below. Lemon and dirty lemon on fins.

12241. Lampinigan Island. September 11, 1909. Length 200 mm.

14359. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 145 mm.

8197. Port Busin, Burias Island. March 8, 1909. Length 495 mm.

14680. Langao Point, Luzon. June 24, 1909. Length 165 mm.

A634, 12239. Simaluc Island. September 22, 1909. Length 190 to 270 mm.

5937. Zamboanga. May 25, 1908. Length 355 mm.

A902, A1200. Doworra Island, Dutch East Indies. December 2, 1909. Length 342 to 346 mm.

A902. Limbe Strait, Celebes. November 10, 1909. Length 445 mm.

A771. Mabul Island. September 29, 1909. Length 290 mm.

A690. Si Amil. September 26, 1909. Length 280 mm.

A740, A744. Sipadan Island. September 28, 1909. Above slaty with more or less olive shade, becoming slate-olive medially on side and nearly lemon yellow below soiled with dusky. Brown band behind preopercle margin. Dorsal like body but somewhat hyaline terminally; edge of soft dorsal purplish with submarginal olive-yellow band, membranes much spotted and posteriorly striped with hyaline olive or brassy. Anal margin purplish, body of fin very dark olive, and yellow blotch with purplish on base. Caudal like lower side, shows purplish after fading with dusky tip. Pectoral dark slate. Ventral like adjacent region of body.

50706 U.S.N.M. Honolulu. Dr. O. P. Jenkins. Type of *Callicanthus metoposophron.*

NASO GENIMARGINATUS Herre

Naso genimarginatus Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 461, pl. 16, fig. 2. New Washington, Ibahay, Subic Bay, Sibuyan.

Depth $2\frac{3}{5}$. About 80 upper teeth, minute, tips microscopically serrate. Dusky brown. Opercle bordered broadly all around by deep broad band. Tongue blue black. Reaches 452 mm.

NASO VOMER (Klunzinger)

Naseus vomer Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 514. Red Sea.

Naseus (Aspisurus) vomer Klunzinger, Fische Roth. Meer., 1884, p. 87, pl. 13, fig. 2 (type).

Naso lopezi Herre, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 467, pl. 7, fig. 2. Ambil Island, Bantayan Island, and Bulalacao Bay.

Depth $3\frac{2}{5}$; head 4, width 2. Snout $1\frac{2}{3}$ in head; eye 4, $2\frac{2}{5}$ in snout, $1\frac{2}{5}$ in interorbital; teeth 52 to 56 in jaws, small, slender, pointed, little compressed, ends minutely serrated; maxillary $5\frac{1}{4}$ in head; interorbital $2\frac{9}{10}$, broadly convex and with slight median ridge to dorsal. Gill rakers 4 + 11, short, robust, compressed points.

Skin minutely asperous, finely rough to touch.

D. VI, 29, I, sixth spine 3 in head, first ray $2\frac{9}{10}$; A. II, 28, I, second spine $3\frac{3}{5}$, first ray $3\frac{1}{2}$; caudal evenly emarginate, lobes pointed, $1\frac{1}{6}$; least depth of caudal peduncle $5\frac{1}{8}$; pectoral $1\frac{2}{3}$; ventral 2; caudal peduncle with 2 bony bucklers each with broad, compressed keel, anterior little larger or $1\frac{1}{5}$ in eye.

Largely dull brown, under surfaces slightly paler. Head, back and sides with many close-set obscure, slightly dark spots, none equal to pupil. Iris brown. Dorsal rays and spines brown, each membrane neutral-dusky with 3 or 4 ill-defined neutral black blotches. Anals like dorsals, largely with but 3 neutral black blotches to each membrane and tip of each ray narrowly gray to whitish, though obscurely so. Caudal brownish like general body color, with obscure brown spots like those on body. Pectoral brown, hind border rather broadly paler brown. Ventral light grayish on membranes, terminally each with deep gray streak; rays and spine brown.

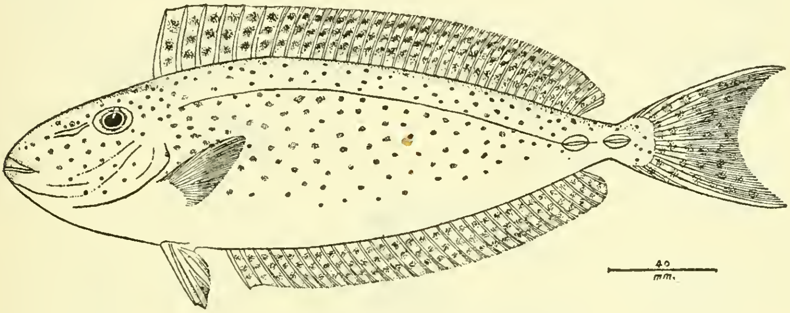

FIG. 22.—NASO VOMER (KLUNZINGER). ADULT

5937. Sabtan Island, Philippines. November 8, 1908. Length 355 mm.

This species is unique in its lack of frontal horn or hump, elongated fusiform body, large eye and obscurely spotted coloration. It is previously only known from Klunzinger's description and figure of examples from the Red Sea. From this we have compiled the following:

Depth 3; head 4. Snout $1\frac{4}{5}$ in head; eye $5\frac{3}{4}$. D. VI, 26 to 28; A. II, 27 or 28. Tail with 2 keeled bucklers each side. Brown to mouse gray. Belly gray yellow. Gill opening dusky. Dorsal smutty yellow with violet streaks. Caudal yellowish and violet, bucklers dirty violet or brownish red. Anal and ventral yellow. Length 540 mm. (Klunzinger.)

NASO TAPEINOSOMA (Bleeker)

Naseus tapeinosoma BLEEKER, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 457. Amboina; Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina); Nederland. Tijds. Dierk., vol. 1, 1863, p. 264 (Atapupu, Timor).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 321 (Manado; Banda).

Priodon tapeinosoma Bleeker, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 494 (Amboina).

Depth 2½ to 2⅔; head 3⅘ to 3⅞, width 2 to 2⅕. Snout 1⅖ in head; eye 3¾ to 4⅘, 2⅔ to 3¼ in snout, 1⅕ to 1⅗ in interorbital; teeth 40 to 42, 50 to 54 with age, small, compressed, pointed, minutely serrate; maxillary 4 to 4⅛ in head; interorbital 3, broadly convex. Gill rakers 4 + 9, short, conic, robust.

Skin minutely asperous, velvety to touch; asperities little larger in smallest example.

D. V, 24, I or 25, I, first spine 2⅛ to 2½ in head, first ray 2⅗ to 2⅔; A. II, 23, I, second spine 3⅕ to 3⅞, first ray 3⅛ to 3⅕; caudal emarginate or lunate, with age upper lobe produced in moderate filament, 2⅘ to 3⅓ in combined head and body; least depth of caudal peduncle 5 to 5⅛ in head; pectoral 1⅗ to 1⅔; ventral $1\frac{9}{10}$ to 2⅛; caudal peduncle with 2 bony bucklers, each with broad keel, anterior larger or 5⅓ to 5⅔.

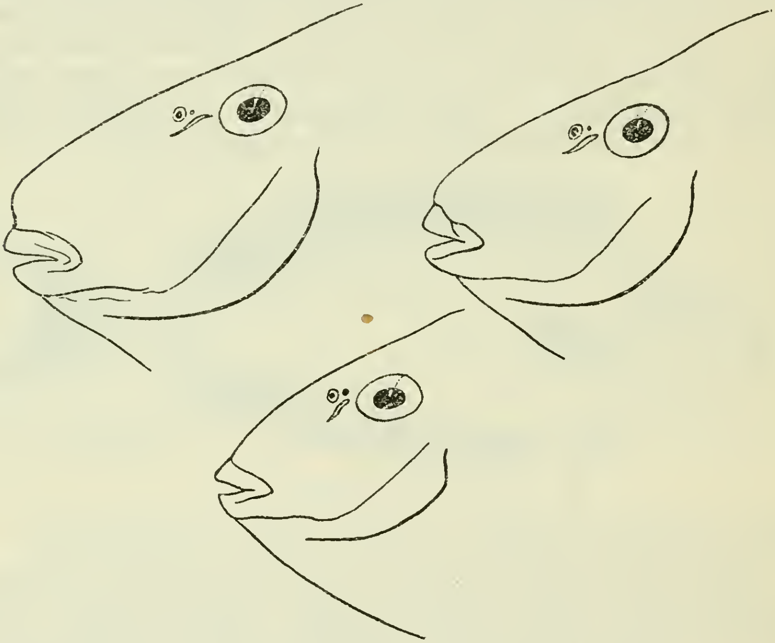

Fig. 23.—Rostral variation with age of Naso tapeinosoma (Bleeker)

Largely uniform brown. Iris light brown. Soft dorsal and anal each with 3 longitudinal blackish-brown bands, rest of fins together with spinous fins dull brown; edges of soft dorsal and anal narrowly whitish. Caudal brown like body, hind edge very narrowly whitish. Paired fins brown, hind pectoral edge rather broadly pale brown.

East Indies. From Günther's translation of Bleeker's description our specimens differ in that Günther gives 29 soft dorsal rays, 28 anal and caudal bucklers not keeled.

7828, 7829. Bugsuk Island. January 5, 1909. Length 418 to 486 mm.
5938. Zamboanga. May 25, 1908. Length 305 mm.

NASO THYNNOIDES (Valenciennes)

Axinurus thynnoides VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 299, pl. 293. Dorey Harbor, New Guinea; Règne Animal Cuvier, Ill., Poiss., 1839, pl. 74, fig. 3.

Naseus thynnoides BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. (5) 5 (Amboina).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 355 (Amboina).

Naso thynnoides HERRE, Philippine Journ. Sci., vol. 34, No. 4, Dec. 1927, p. 469, pl. 7, fig. 3 (Bulalacao Bay, Tablas, Ibahay, Mariveles, Dumaguete).

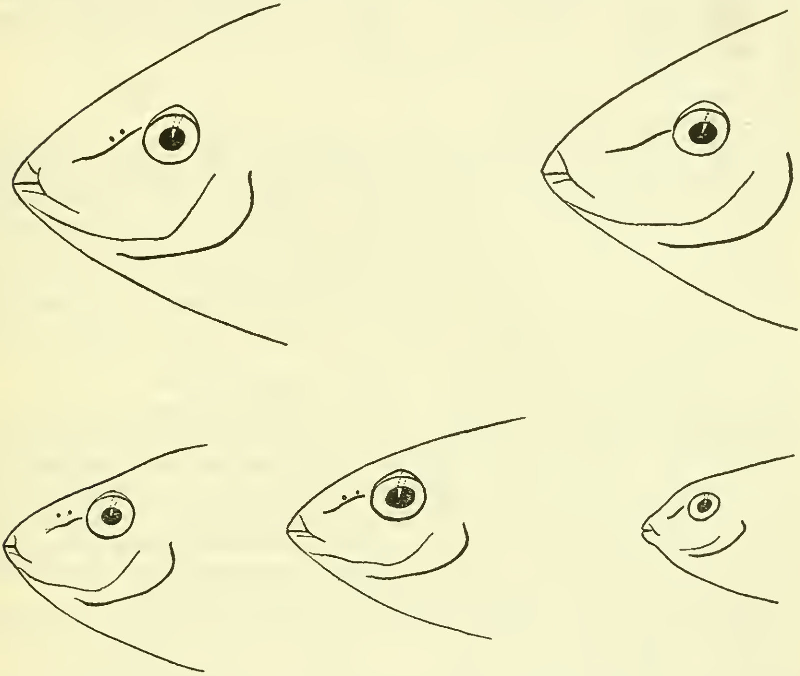

FIG. 24.—ROSTRAL VARIATION WITH AGE OF NASO THYNNOIDES (VALENCIENNES)

Depth 2⅘ to 3⅛; head 3⅘ to 4¼, width 1⅞ to 2. Snout 1⅞ to 2 in head; eye 2⅞ to 4¼, 1⅓ to 2¼ in snout, 1 to 1⅗ in interorbital; teeth 60 to 64 in jaws, slender, little compressed, pointed; maxillary 4¼ to 5 in head; interorbital 2⅔ to 3, broadly convex in young, convexly elevated with age. Gill rakers 4 + 11, fleshy, broad, short.

Body minutely asperous, velvety to touch; asperities scarcely larger in young, velvety.

D. III or IV, 29, i or 30, i, last spine 2 to 2⅖ in head, first ray 2 to 2⅓; A. II, 27, i or 28, i, second spine 3⅛ to 3⅓, first ray 2½ to 2⅘; caudal deeply emarginate or forked in young, slightly emarginate as expanded in adult, 4 to 4½ in combined head and body; least depth of caudal peduncle 5¼ to 5⅔ in head; pectoral 1⅗; ventral 2 to 2¼; caudal peduncle with single caudal spine on buckler, base 1⅓ to 2⅕ in eye, vestigeal and only present on left side in youngest example.

Dull brown, scarcely paler below. Iris brown. Dorsal and anal brownish black with several whitish bands obliquely and longitudinally, edges also narrowly whitish. Other fins pale brownish.

East Indies, Philippines. *Axinurus thynnoides* was based on an example but 152 mm. long and agrees in every way with our small specimens. The species reaches a moderate size and is known chiefly by its elongate body and the presence of but a single pair of caudal spinous bucklers, one each side. The front profile of the head is also but very slightly convex, nearly straight.

9914. Inamucan Bay, Mindoro. August 8, 1908. Length 135 mm. Only a left rudimentary caudal spine.

5782, 12237, 12238 [1977], 16935 to 16938, 19586. Simaluc Island. September 22, 1909. General color dark slaty, apparently nearly uniform. In fading back becomes lavender-gray and belly paler; upper portion of side and back, as well as top of head, then shows abundant mottling of paler spots and short vertical bars on middle of side and on head spots round. Dorsals similar to body in color, crossed by 3 or 4 slightly oblique hyaline bars, very irregular on spinous portion. Margins of both dorsal and anal hyaline. Anal like dorsal, but with narrower bars. Caudal like body. Pectorals slightly straw-color terminally, slaty at bases.

A805. Zamboanga market. October 6, 1909. Length 327 mm.

A804. Zamboanga market. October 9, 1909. Length 320 mm.

A1364, A1377 to A1380. Basa Island, Gulf of Boni, Dutch East Indies. December 17, 1909. Length 237 to 254 mm. Faded pale gray and distinguished only by numerous narrow bars across back down to middle of side, about ⅓ width of interspaces and bar with interspace slightly less than diameter of pupil. Dorsals clouded with opaque white on basal half of membrane. Anal similar, but markings more nearly continuous in central bar. Caudal like body, with single spine. Pectoral with slight shade of straw-color.

A1197 to A1199. Doworra Island, Patiente Strait, Dutch East Indies. December 2, 1909. Length 360 to 362 mm.

A903. Limbe Strait, Celebes. November 10, 1909. Length 293 mm.

12239. Hokuho, Soo Wan, Formosa. June 29, 1910. Length 240 mm.

We also append the following two species, which are very doubtful:

NASO PUNCTULATUS (Valenciennes)

Naseus punctulatus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 289 (on Vlaming).

Shorter than *Naso olivaceus*, profile ascending in rounded curve, with distinct tuberosity. Caudal emarginate, lobes not ending in filaments. Body blue, nearly black, with scattered small white or bluish dots. Caudal plate colorless. Dorsal with blue basal line. Anal with blue line and red line. (Valenciennes.)

A doubtful species, never established.

NASO TRIPELTES (Valenciennes)

Naseus tripeltis VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1831, p 276 (on VLAMING, RENARD, and VALENTYN).—GÜNTHER, Cat. Fish. Brit. Mus, vol. 3, 1861, p. 349 (copied).

A doubtful nominal form, said to have the forehead with a produced horizontal horn and 3 bony, carinated caudal bucklers.

Genus PRIONURUS Lacépède

Prionurus LACÉPÈDE, Ann. Mus. Hist. Nat. Paris, vol. 4, 1804, p. (205) 211. Type *Prionurus microlepidotus* LACÉPÈDE, monotypic.

Xesurus JORDAN and EVERMANN, Rep. U. S. Fish Comm., pt. 21, 1895 (1896), p. 421. Type *Prionurus punctatus* GILL, orthotypic.

Acanthocaulis WAITE, Rec. Australian Mus., vol. 3, 1900, p. 206. Type *Prionurus microlepidotus* LACÉPÈDE, virtually (as *Acanthocaulis* WAITE proposed to replace *Prionurus* LACÉPÈDE).

This genus is known by the presence of 3 to 6 caudal bucklers each side. In other respects it is greatly like *Naso*. Besides the species below several others have been described from the Eastern Pacific.

PRIONURUS MICROLEPIDOTUS Lacépède

Prionurus microlepidotus LACÉPÈDE, Ann. Mus. Hist. Nat. Paris, vol. 4, 1804, p. (205) 211. No locality (voyage of Peron).—VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 295, pl. 292 (type).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 347 (copied).

Prionurus scalprum VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 298. Japan.—SCHLEGEL, Fauna Japon., Poiss., dec. 7–9, 1845, p. 129, pl. 70 (Nagasaki).—BLEEKER, Verh. Batav. Genoot. (Nal. Ichth. Japan), vol. 25, 1853, p. 15.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 347 (Japan).

Acanthurus scalprum (LANGSDORF) VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 298 (name in synonymy).

Xesurus scalprum JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1903, p. 556 (Tokyo, Misaki, Wakanoura).

Etroplus formosus BREVOORT, Narr. Exp. Japan, Perry, vol. 2, 1856, p. 264, pl. 6, fig. 1. Lew Chew (Riu Kiu).

Depth 2; head 3½; eye 4 in head, 2⅔ in snout, 1½ in interorbital. D. IX, 22; A. III, 21 to 23. Dusky brown, caudal narrowly white edged.

Riu Kiu and southern Japan.

38822 U.S.N.M. Tokyo market. Japanese Educational Museum. Length 155 mm.

50756 U.S.N.M. Nagasaki, Japan. Jordan and Snyder. Length 220 to 240 mm. Two examples.

57496 U.S.N.M. Japan? P. L. Jouy. Length 200 to 230 mm. Four examples.

70753 U.S.N.M. Misaki, Sagami. *Albatross* collection, 1906. Length 32 to 56 mm. Twenty-three examples.

Family SIGANIDAE

Body oblong or ellipsoid and compressed. Caudal peduncle unarmed. Mouth small. Teeth uniserial, trenchant, serrated incisors. Palate edentulous. Gill membranes not united, attached to isthmus. Pseudobranchiae well developed. Branchiostegals 5. Air vessel large, forked before and behind. Intestine with round convolution. Pyloric coeca 5 or 6. Vertebrae 23, of which 13 caudal. Scales very small, cycloid. Lateral line complete. Dorsal single, very strong spines 13, rays 10. Anal with 7 well-developed spines, rays 9. Caudal cuneate. Ventrals thoracic, with an outer and inner spine and 3 soft rays between.

Indo-Pacific. Herbivorous. A single genus. Easily distinguished from all the other fishes of the series here studied by the increased anal and ventral spines.

Genus SIGANUS Forskål

Siganus Forskål, Descript. Animal., 1775, pp. x, 25. Type *Scarus rivulatus* Forskål=*Scarus siganus* Forskål, alternate name, tautotypic.

Centrogaster Houttuyn, Verh. Holland. Maatsch. Haarlem, vol. 20, 1782, p. 333. Type *Centrogaster fuscescens* Houttuyn, designated by Jordan and Evermann, Genera of Fishes, vol. 1, 1917, p. 44.

Amphacanthus Schneider, Syst. Ichth. Bloch, 1801, p. 206. Type *Amphacanthus guttatus* (part) Schneider=*Teuthis javus* Linnaeus, latter designated by Desmarest, Encycl. Hist. Nat. Rept. Poiss., Chenu, 1874, p. 240.

Amphacantus Cuvier, Règne Animal, vol. 2, 1817, p. 330. Type *Teuthis javus* Linnaeus.

Buro (*Commerson*) Lacépède, Hist. Nat. Poiss., vol. 5, 1803, p. 421. Type *Buro brunneus* Lacépède, monotypic.

Buronus Rafinesque, Analyse de la Nature, 1815, p. 88. Type *Buro brunneus* Lacépède, virtually (as *Buronus* Rafinesque proposed to replace *Buro* Lacépède).

Amphiscarus Swainson, Nat. Hist. Animals, vol. 2, 1839, p. (172) 227. Type *Siganus fuscus* Griffith, monotypic.

Siganites Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 546. Type *Chaetodon canaliculatus* Mungo Park, orthotypic.

Lo Seale, Occas. Papers Bishop Mus., vol. 4, No. 1, 1906, p. 71. Type *Amphacanthus vulpinus* Schlegel, monotypic.

Characters of the genus in that of the family.

We have admitted the arrangement of species grouped primarily on color pattern, following Günther, as we believe this more closely expresses phylogeny than structural characters.

ANALYSIS OF THE SPECIES

I. Siganus. Snout not produced or muzzle not protruded.

a^1. Ground color darker than markings which form whitish golden or bluish spots or vermiculated lines.

 b^1. Depth 1¾ to 2¼.

  c^1. Caudal slightly or moderately emarginate.

d^1. Body marked with spots, at least on back.

e^1. Back with pale round spots, oblong on middle of side, form longitudinal streaks on belly; head uniform, also fins---------- **javus**

e^2. Back spotted, but no longitudinal streaks on belly.

f^1. Fins dotted or variegated with darker.

g^1. No dark shoulder blotch; body above with golden rounded spots, usually smaller towards abdomen.

h^1. Some brown dots on vertical fins------------- **concatenatus**

h^2. Fins greenish, spines blackish, rays variegated with dusky. **kopsii**

g^2. Dark shoulder blotch, about size of eye.

i^1. Brownish olive, with small, scattered, roundish, whitish spots on back and sides, which much smaller than interspaces between------------------------ **albopunctatus**

i^2. Whole head, trunk, tail and caudal base covered with minute close-set whitish dots----------- **punctatissimus**

f^2. Fins immaculate; body red, with numerous undulated and reticulated transverse longitudinal short blue lines---- **labyrinthodes**

d^2. Brown, with vermiculated bluish lines on head and whole body except belly, caudal dotted all over with brown------------- **vermiculatus**

c^2. Caudal deeply emarginate or forked.

j^1. No dark shoulder blotch; orange, with small sky-blue dots on body and bases of caudal and anal; dots very small, much smaller than interspaces between, but larger and more crowded on head and thorax. **corallinus**

j^2. Dusky shoulder blotch equals eye; brown, minutely dotted all over with white, dots invading dark shoulder blotch ------------------------------------- **sutor**

b^2. Depth $2\frac{1}{3}$ to 3.

k^1. Caudal deeply emarginate or forked.

l^1. Back with rounded whitish dots which become oblong on sides and much smaller than spaces between------------------------------- **oramin**

l^2. Brown (in life body covered with small, close-set yellow spots or blotches equal to or larger than spaces between); dorsal, anal and ventral blotched with dusky------------------------ **rostratus**

k^2. Caudal scarcely or but slightly emarginate.

m^1. Brown, dotted all over whitish, dots very small and extend on dorsal and anal; caudal and paired fins brown --------------- **tumifrons**

m^2. Back and sides with numerous blue dots; dark blotch at shoulder------------- **canaliculatus**

a^2. Ground color blue, with golden hexagonal dots placed densely and covering head, body and vertical fins; caudal deeply emarginate; depth $2\frac{1}{5}$. **punctatus**

a^3. Ground color lighter than markings, which in form of brown spots or vermiculated streaks; depth 2 to $2\frac{3}{5}$.

n^1. Caudal subtruncate or moderately emarginate.

o^1. Reddish, with reddish-gray cloudings on head; body, caudal and bases of dorsals and anals densely spotted with reddish brown. **guttatus**

o^2. Light brownish olive; body with brown spots, which smaller than interspaces between and confluent on back into short narrow, vermiculated streaks-------------**notostictus**

n^2. Caudal forked; grayish, covered all over with small brown spots which larger than interspaces; greenish-yellow predorsal spot. **stellatus**

a^4. Color uniform or irregularly marbled, outlines of markings not defined; caudal little emarginate.

p^1. Depth 2⅖ to 2¾.

q^1. Uniform brownish; depth 2⅖ to 2⅗. **fuscescens**

q^2. Blackish-brown; irregularly marbled lighter; depth 2¾------------**luridus**

p^2. Depth 3⅘; back brownish, body otherwise silvery---------------------**argenteus**

a^5. Markings darker than ground color, chiefly formed as longitudinal streaks.

r^1. Depth 2¼; brown, with 9 or 10 brown longitudinal streaks anastomosing with one another; head with some oblique bluish lines; yellowish spot below soft dorsal dotted with black and edged red; caudal, anal and hind part of tail with brown spots. **lineatus**

r^2. Depth 2½ to 2⅔; bluish with violet streaks, which broader than interspaces between, longitudinal on sides, more vermiculated and reticulated on back-------------**spinus**

a^6. Very distinct transverse streaks; caudal moderately or deeply emarginate, especially with age.

s^1. Depth 2 to 2⅔.

t^1. Olivaceous, with several irregular, diffuse, longitudinal yellow lines and with diffuse brownish cross bands extending on dorsal fin. **rivulatus**

t^2. Yellow, with 4 pairs of undulated brownish bands across back. **tetrazonus**

t^3. Orange, with 30 vertical bluish lines, last of which bent and run longitudinally along posterior part of tail; those above pectoral oblique and those on opercle reticulated -----------**doliatus**

t^4. Orange, front portion of sides with about 6 undulated blue transverse streaks, hind one with blue longitudinal streaks; which united with hindmost transverse streaks; broad brown band from neck through eye to lower jaw-------------**puellus**

s^2. Depth 1¾ to 1⅞. Light brownish-yellow, forehead and neck with transverse bluish stripes; oblique deep brown, blue edged band descends from fourth to sixth dorsal spines to pectoral base; second similar band from dorsal origin to orbit and interspace between bands yellow; scattered blue dots on upper parts of body; some oblique bluish streaks on snout..........virgatus

II. Lo. Snout produced, muzzle as short tube; largely uniform gray brown, head, thorax, and upper pectoral ray dusky........................vulpinus

SIGANUS JAVUS (Linnaeus)

Teuthis javus LINNAEUS, Syst. Nat., ed. 12, vol. 1, 1766, p. 507. Java.—WALBAUM, Arted Pisc., vol. 3, 1792, p. 623 (on LINNAEUS).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 315 (Ceylon, Pinang, Singapore, Amboina, Hobson Bay).—BLEEKER, Nat. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).—MEYER, An. Soc. Española Hist. Nat., Madrid, vol. 14, 1885, p. 22 (Macassar, South Celebes; Manila Bay, Cebu).—BOULENGER, Proc. Zool. Soc. London, 1887, p. 659 (Muscat).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Luzon, Manila, Cebu).—FOWLER, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 545 (Padang).

Theutis javus BONNATERRE, Tabl. Ichth., 1788, p. 157 (Java).

Teuthis java CANTOR, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1189 (Malay Peninsula and Islands).—DAY, Fishes of Malabar, 1865, p. 125.—BLEEKER, Verslag. en Mededeel. Akad. Wet. Amsterdam, ser. 2, vol. 2, 1868, p. 291 (Rio, Bintang).—DAY, Fishes of India, pt. 1, 1875, p. 165, pl. 40, fig. 1; Fauna Brit. India, vol. 2, 1889, p. 88.

Theutis java DÜNCKER, Mitt. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 159 (Singapore).

Amphacanthus javus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 118 (Pondichery, Batavia, Malacca).—SCHLEGEL and MÜLLER, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 10 (Batavia).—BLEEKER, Verh. Batav. Genootsch. (Madura), vol. 22, 1849, p. 5 (Kammal); (Nal. Ichth. Bengal), vol. 25, 1853, p. 48; Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 471 (Rio); vol. 3, 1852, p. 53 (Singapore), p. 717 (Karangbadji, Banka), p. 740 (Macassar); vol. 5, 1853, p. 154 (Macassar); vol. 7, 1854, p. 227 (Macassar), p. 313 (Bantem); vol. 10, 1856, p. 347 (Rio, Bintang); vol. 12, 1856, p. 215 (Nias); vol. 16, 1858, p. 408 (Japara, Java); vol. 17, 1858–59, p. 143 (Boleling, Bali); vol. 20, 1859–60, p. 141 (Badjoa, Boni); vol. 21, 1860, p. 138 (Muntok, Banka).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 326 (Macassar).

Amphacanthus javanus CASTELNAU, Res. Fish. Australia (Victoria Rec. Philadelphia Exhib.), 1875, p. 29 (Cape York, Queensland).—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 394 (Singapore, Bangkok, Batavia).

Siganus javus JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907) p. 35 (Cavite).—EVERMANN and SEALE, Bull. Bur. Fish., p. 98 (Bulan).—JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Manila and Iloilo).—SEALE, Philippine Journ. Sci., vol. 5, ser. 4, 1910, p. 283 (Sandakan, North Borneo).—BEAUFORT, Bijd. Dierk. Amsterdam, vol. 19, 1913, p. 126 (Waigiu).—FOWLER, Copeia, No. 58, June 18, 1918, p. 64

(Philippines).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 57 (Cebu, Philippines).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Vigan, Orion, Philippines, Manila).

Amphacanthus russelii Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 123 (on *Worahwah* Russell, Fishes of Coromandel, vol. 2, 1803, p. 2, pl. 103, Vizagapatam).—Bleeker, Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1953, p. 48.

Depth $2\frac{1}{10}$ to $2\frac{1}{4}$; head $3\frac{2}{3}$ to $4\frac{1}{5}$, width $1\frac{7}{8}$ to $2\frac{1}{10}$. Snout $2\frac{1}{3}$ to $2\frac{2}{5}$ in head; eye $2\frac{4}{5}$ to $4\frac{3}{4}$, $1\frac{1}{6}$ to $2\frac{1}{8}$ in snout, 1 to $1\frac{3}{4}$ in interorbital; teeth about 48 to 50 in each jaw; maxillary $3\frac{1}{4}$ to $3\frac{7}{8}$ in head; interorbital $2\frac{3}{5}$ to $2\frac{3}{4}$, broadly convex; preopercle limb, opercle and supra-scapular arch finely striate. Gill rakers 4 + 18, short, cuneate points.

Scales minute, ovoid, elongate, cycloid, 55 to 120 circuli. Cheek more or less entirely covered with small scales to preopercle ridge.

D. XIII, 10, I, fifth spine $1\frac{3}{4}$ to 2 in head, third ray $1\frac{3}{4}$ to $1\frac{9}{10}$; A. VII, 9, I, third spine $1\frac{3}{4}$ to 2, third ray $1\frac{3}{4}$ to $2\frac{1}{6}$; caudal lunate, moderately emarginate, $3\frac{3}{5}$ to $3\frac{4}{5}$ in combined head and body; least depth of caudal peduncle $3\frac{2}{3}$ to 4 in head; pectoral $1\frac{1}{8}$ to $1\frac{1}{4}$; ventral $1\frac{3}{4}$ to $1\frac{4}{5}$.

Back and upper surfaces variably brown to darker, below much paler. Back rather finely spotted with grayish, spots usually very small and crowded on predorsal, often tendency to form short horizontal gray bars of variable length. Below lateral line variable gray-white longitudinal bands, often waved somewhat or with 10 or 12 more or less complete and broader below median axis of body. Cheek mottled or speckled with gray-white blotches, as very numerous dots with age. Vertical fins brownish, more or less clouded with dusky, anal with grayish-white tinge. Pectoral pale or grayish-brown. Ventral more or less whitish, with grayish shades. Iris grayish to whitish.

Ceylon, India, East Indies, Philippines. Preserved specimens are often quite dark or with very obscure markings.

20132. Bacoor, Luzon market. June 15, 1908. Length 123 mm.

One example. Below mouth of Mindanao River, Cotabato, Mindanao. May 20, 1908. Length 60 mm.

12402. Bolalo Bay, Palawan. December 21, 1908. Length 188 mm.

5673. Busin Harbor, Burias Island. April 23, 1908. Length 254 mm.

5515, 8860, 13800. Catbalogan, Samar. April 15, 1908. Length 158 to 260 mm. Very dark bay, nearly black. Top of head and body with elliptical dark greenish spots; breast and belly paler; purplish shades showing as stripes of more intense color changing to bronze toward middle of body. Side of head olive. Dorsal very dark olive. Anal bronzed. Caudal dark purplish smoky. Pectoral rays dusky olive, membranes hyaline. Ventral dusky, with bronze shades.

Five examples. Cotabato, below mouth of Mindanao River, Mindanao. May 20, 1908. Length 70 to 105 mm.

5996. Cavite market. December 1, 1908. Length 105 mm.

12807. Little Santa Cruz Island, Zamboanga. May 26, 1908. Length 168 mm.

Four examples. Malampaya River, Palawan. December 26, 1908. Length 59 to 78 mm.

One example. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 32 mm.

One example. Manila market. December 12, 1907. Length 100 mm.

Two examples. Mansalay. June 4, 1908. Length 53 mm.

Six examples. Mantaguin Bay, Palawan. April 2, 1909. Length 48 to 53 mm.

9041, 9042. Nabatas Point, Samar. July 24, 1908. Length 132 to 260 mm.

43801. Philippines. Length 180 mm.

20073. Putor River, Mindanao. January 30, 1909. Length 78 mm.

8211, 14971 [1261]. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 54 to 333 mm.

One example. River at Pasacao, Luzon. March 9, 1909. Length 50 mm. Generally smoky olive, becoming purplish after death; spots and stripes below somewhat pearly to bluish. Side and top of head with more or less yellow tinge. Median ventral region, from middle of breast backward orange, continued to spinous part of anal. Vertical fins nearly like body color, with more or less orange shades. Pectoral plain dusky, membranes nearly hyaline. Ventral with orange on rays and spines.

5480, 5483 to 5485, 5487 to 5489, 12268, 12269. San Juanico Strait, Leyte. April 13, 1908. Length 123 to 240 mm.

11327. San Roque, Leyte. July 29, 1909. Length 185 mm.

One example. Subig Bay. January 7, 1908. Length 43 mm.

5477. Tacloban market, Leyte. April 12, 1908. Length 234 mm. Ground color sepia, with round and ovate gray spots on back and sides; lower side with 10 alternating gray and primrose yellow stripes, narrower than pupil, fading out on lower side and belly. Dorsals dusky cinnamon, tips of spines hyaline. Anal dusky, ochraceous buff. Caudal clove brown. Pectoral hyaline. Ventral white, membranes hyaline.

12043 to 12046. Sandakan, Borneo. March 2, 1908. Length 164 to 188 mm.

5053. Sibutu Island, Borneo. February 29, 1908. Length 162 mm.

Three examples. Mactan Island, tide pools, Celebes. August 31, 1909. Length 30 mm.

30503 U.S.N.M. New Guinea. Australian Museum. Length 98 mm.

30602 U.S.N.M. New Guinea. Australian Museum. Length 107 mm.

55941 U.S.N.M. Bulan. Bureau of Fisheries. Length 258 mm. [4092].

55951 U.S.N.M. Bulan. Bureau of Fisheries. Length 227 mm. [4093].

56316 U.S.N.M. Cavite. G. A. Lung. Four examples. Length 95 to 120 mm.

72704 U.S.N.M. Java. Bryant and Palmer. Two examples. Length 143 to 192 mm.

72746 U.S.N.M. Iloilo. R. C. MacGregor. Length 88 mm.

SIGANUS CONCATENATUS (Valenciennes)

Amphacanthus concatenatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 127. Buru; Batavia.—BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 1, No. 5, 1856, p. (6) 46 (Amboina); Nat. Tijds. Nederland. Indië, vol. 22, 1860, p. 113 (Buru).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 330 (Saleyer).

Teuthis concatenata CANTOR, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1190 (Pinang).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 316 (Amboina, Pinang, Singapore); Journ. Mus. God ffroy, vol. 2–3, Heft 5–6, 1874, p. 88 (Pelew Islands).—DAY, Fishes of India, pt. 2, 1876, p. 167, pl. 40, fig. 4.—MEYER, An. Soc. Española, Hist. Nat.

Madrid, vol. 14, 1885, p. 22 (North Celebes).—Day, Fauna Brit. India, vol. 2, 1889, p. 90.—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 425 (Ternate).—Pellegrin, Bull. Soc. Zool. France, vol. 30, 1905, p. 84 (Baie d'Along, Tonkin).

Siganus concatenatus Jordan and Seale, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 789 (Negros).

Siganus lineatus (not Valenciennes) Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98 (Bulan).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Aparri).

Siganus vermiculatus (not Valenciennes) Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 248 (Zamboanga).

Siganus corallinus (not Valenciennes) Bean and Weed, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 607 (Batavia).

Siganus guttatus (not Bloch) Bean and Weed, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 607 (Batavia).

Depth 1¾ to 2⅛; head 3¼ to 3⅞, width 2 to 2⅓. Snout 1⅞ to 2¼ in head; eye 3 to 4¼, 1⅓ to 2¼ in snout, 1 to 1⅓ in interorbital; teeth 48 to 50 in each jaw; maxillary 3⅗ to 3¾ in head; interorbital 2⅞ to 3, broadly convex; preopercle limb, infraorbital, opercle and scapular arch with fine radiating or parallel striae. Gill rakers 5 + 20, short, flexible, cuneate points.

Scales moderately small, lozenge-shaped, 65 to 100 circuli. Cheek fully covered with small scales to preopercle ridge.

D. XIII, 10, I, fifth spine 1⅘ to 2 in head, third ray 1⅕ to 1⅗; A. VII, 9, I, third spine 1¾ to 2⅛, third ray 1⅓ to 1¾; caudal lunate, moderately emarginate, 1 to 1⅛; least depth of caudal peduncle 3⅙ to 4; pectoral 1⅒ to 1¼; ventral 1⅖ to 2.

Brown generally, scarcely paler on breast and belly. Head and body everywhere with close-set, variable, rounded, grayish to golden spots, not larger than pupil; on head more or less formed as short reticulating lines or variable reticulations; in young spots much larger and greatly less numerous than in adult. Iris brownish. Fins brownish, vertical ones clouded with darker or dusky and caudal with obsolete scattered inconspicuous dark spots. In young vertical fins with paler ground-color and more contrasted in speckling and with dark blotches or streaks, often a dark transverse band at caudal base. Pectoral pale or uniform brownish. Ventral pale, variegated with brown.

East Indian region. A broadly oblong species, well figured by Day. It is known by its well-spotted color design, with age the spots appearing as ocelli narrowly margined with darker. Often several oblique dark bands or lines are formed along the cheek, one from the end of the maxillary up to the eye. Some preserved examples quite dark and the usual light spots darker than the ground color.

7463. Bolalo Bay. December 21, 1908. Length 264 mm.
20316, 20317. Bolinao Bay. May 10, 1909. Length 132 to 141 mm.

19109. Buena Vista, Guimaras Island. January 14, 1909. Length 85 mm.

15694. Busin Harbor, Burias Island. March 8, 1909. Length 203 mm.

5624. Busin Harbor. April 22, 1908. Length 248 mm.

21697. Cabugao Bay, Catanduanes Island. June 9, 1909. Length 58 mm.

5514. Catbalogan, Samar. April 15, 1908. Length 245 mm. Back and top of head slaty, umber below posteriorly. Very pale slaty shades on chin and throat, merged between. Side of head bronze umber with slate stripes and spots. Spinous vertical fins bronze, soft vertical fins smoky purplish with very dark bronze spots. Yellow bronze blotch below hind part of dorsal in front of caudal peduncle, appears bright yellow as viewed from above as fish is in water.

5848, 8275, 18502, 21849 to 21850. Canmahala Bay, Ragay Gulf, Luzon. March 11, 1909. Length 90 to 208 mm.

21818. Cebu Market. March 20, 1909. Length 50 mm.

7559. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Spots bronze, fading to orange. Lines on head slate. Blotch below dorsal axil golden.

7492. Endeavor Strait. December 28, 1908. Length 295 mm.

Two examples. Estero, Sablayan Bay, Mindoro. December 13, 1908. Length 43 to 67 mm.

16999, 17001 to 17003, 17005, 17007 to 17014, 17016, 17017. Galvaney Island-Ragay Gulf, Luzon. March 9, 1909. Length 85 to 137 mm.

5744. La General Island, Capunuypugan, Mindanao. May 9, 1908. Length 285 mm.

5772. Lianga Bay. May 12, 1908. Length 305 mm.

8825. Maculabo Island. June 13, 1909. Length 340 mm.

7426. Malcochin Harbor, Linapacan Island. December 18, 1908. Length 285 mm.

8050. Manila market. March 18, 1908. Length 95 mm.

6151 to 6153. Mansalay, Mindanao. June 4, 1908. Length 220 to 260 mm.

22017, 22018. Mariveles Bay. January 27, 1909. Length 140 to 153 mm.

7240. Masinloc Bay, Zambales. November 22, 1908. Length 274 mm.

One example. Mouth Mindanao River, vicinity Cotabato, Mindanao. May 20, 1908. Length 38 mm.

9043. Nabatas Point, Samar. July 24, 1909. Length 260 mm.

21716. Nato River, tidal. June 18, 1909. Length 90 mm.

7939. Pagapas Bay, Luzon. February 20, 1909. Length 250 mm.

5922. Parang, Mindanao. May 23, 1908. Length 235 mm.

7999. Port Banalacan, Marinduque Island. February 23, 1909. Length 332 mm.

8187. Port Busin, Burias Island. March 8, 1909. Length 298 mm.

8389. Port Dupon, Leyte. March 17, 1909. Length 275 mm.

10515. Port Jamelo, Luzon. July 13, 1908. Length 195 mm.

7013, 7014. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 382 to 423 mm.

7325. Pucot River, Mariveles. January 29, 1909. Length 62 mm.

8976. Rapu Rapu Island and Strait. June 22, 1909. Length 384 mm.

5273, 5274. Romblon Harbor. March 25, 1908. Length 332 to 373 mm.

8696, 8706. San Miguel Island. June 4, 1909. Length 267 to 300 mm.

20327. San Pascual, Burias Island. March 8, 1909. Length 113 mm.

Two examples. San Pascual tide pool. March 8, 1909. Four broad bands across lower surface of head and broader one across chest. Body also blotched and speckled with whitish. Spinous dorsal, anal and caudal mottled with brown, latter with 4 or 5 dark blotches along each outer edge above and below and brown band at base of fin.

8810, 8812, 21671, 21672. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 90 to 106 mm.

4888. Siasi Island. February 16, 1908. Length 310 mm. Ground color slate gray, more bluish on back, olive slate on forehead. Side of head brassy yellow, ground color showing as indigo stripes and spots; narrow stripe from front of eye halfway to preorbital edge, another beneath, near lower preorbital edge to angle; third somewhat parallel rises near upper opercle edge and extends irregularly and obliquely to lower corner of mouth; below 3 round spots on middle of cheek; branch from last line extends downward in front of hind preopercle edge and ends above front of lower limb; two spots near preopercle angle; opercle with indistinct lines and 1 round spot. Over entire side and caudal peduncle above level of pectoral base numerous rounded and elliptical bronze spots, slightly less than pupil. Broad blotch about 1½ times eye below hind end of dorsal. Iris olive and golden. Dorsals dark olive with plumbeous shades on soft rays. Anal like dorsal, spinous fin with orange shades, soft fin more plumbeous. Caudal dusky plumbeous, edge darker and entire fin thickly spotted with small round dusky spots ⅓ diameter of pupil. Pectoral hyaline dusky. Ventral dusky, first spine with yellowish blotches.

5716. Surigao, Mindanao. May 8, 1908. Length 328 mm.

7841. Taganak Island. January 7, 1909. Length 235 mm.

4923. Tataan, Simaluc Island. February 20, 1908. Length 240 mm. Generally azure blue, everywhere with orange spots slightly smaller than pupil. Under surface drab. Large orange spot just below and before soft dorsal axil. Reticulating blue lines on nuchal region down across preopercle, cheek, snout and top of head with smaller blue dots. Spinous dorsal pale lemon yellow and soft dorsal with bluish rays, membranes pale red. Spinous anal like spinous dorsal. Anal with blue rays, membranes with orange wash. Caudal pale blue, darker at tip. Pectoral grayish-white. Ventral yellowish-white, spines drab. Iris yellow.

6438. Tilig, Lubang. July 14, 1908. Length 335 mm.

7959. Ulugan Bay, Palawan. December 28, 1908. Length 318 mm.

6664, 6665. Varadero Bay, Mindoro. July 23, 1908. Length 222 to 227 mm.

A1518. Daisy Inlet, Bumbum Island. Jan. 6, 1910. Length 356 mm.

A1229. Gomomo Island. December 3, 1909. Length 305 mm.

5049. Sandakan, Borneo. February 29, 1908. Length 225 mm.

12042, 20395. Sandakan. March 2, 1908. Length 84 to 147 mm.

A938. Dodepo and Pasejogo Islands, Dutch East Indies. November 16, 1909. Length 255 mm.

A936, A937. Pasejogo Islands. November 16, 1909. Length 258 to 265 mm.

A890. Limbe Strait, Celebes. November 10, 1909. Length 320 mm.

30563 U.S.N.M. New Guinea. Australian Museum. Length 233 mm.

52043 U.S.N.M. Negros Island, Philippines. Dr. Bashford Dean. Length 208 mm.

55952 U.S.N.M. Bulan, Philippines. Length 258 mm. (4056 B. F.). Philippine Commission. As *Siganus lineatus*.

58053 U.S.N.M. Zamboanga, Philippines. Dr. E. A. Mearns. Two examples. Length 200 to 232 mm. As *Siganus vermiculatus*.

71685 U.S.N.M. Nafa, Okinawa, Riu Kiu Islands. Two examples. *Albatross* Collection, 1906. Length 120 to 123 mm.

72267 U.S.N.M. Aparri, Philippines. R. C. MacGregor. Length 85 mm. As *Siganus lineatus*.

72700 U.S.N.M. Java. Bryant and Palmer. Length 230 mm. As *Siganus guttatus.*

72699 U.S.N.M. Java. Bryant and Palmer. Length 80 mm. As *Siganus corallinus.*

75906 U.S.N.M. Borneo. H. C. Raven. Length 287 mm.

84209 U.S.N.M. Philippines. Dr. Fred Baker. Length 130 mm.

SIGANUS KOPSII (Bleeker)

Amphacanthus kopsii BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. (472) 483. Rio; vol. 3, 1852, p. 445 (Banka), p. 546 (Amboina); vol. 12, 1856, p. 215 (Nias).

Teuthis kopsii BLEEKER, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 2, ser. 2, 1868, p. 291 (Rio, Bintang).

Depth 2⅔. Caudal truncate. Reddish-green above, silvery-yellowish below. Back and sides with silver or yellow spots. Fins greenish, spines blackish, rays variegated dusky. Caudal brown. Length 145 mm. (Bleeker.)

Possibly not different from *Siganus concatenatus.*

SIGANUS ALBOPUNCTATUS (Schlegel)

Amphacanthus albopunctatus SCHLEGEL, Fauna Japon., Poiss., dec. 7–9, 1845, p. 128. Nagasaki Bay, Japan.—KNER, Reise Novara, Fische, 1865, p. 206 (Java; Manila).—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 394 (Nagasaki Bay; Singapore).

Teuthis albopunctatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 318 (Amoy, China, Philippines).—SCHMELTZ, Mus. Godeffroy Cat., vol. 5, 1874, p. 30 (Bowen).—SAUVAGE, Bull. Soc. Philomath. Paris, vol. 5, ser. 7, 1881, p. 106 (Swatow, China).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Singapore).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 48, 1884, p. 25 (Kagoshima).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (North Celebes).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Luzon, Manila, Batangas, Nasugbu).—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 34.

Siganus albopunctatus SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 284 (Sandakan, north Borneo).

Amphacanthus aurantiacus SCHLEGEL, Fauna Japon., Poiss., dec. 7–9, 1845, p. 128. Nagasaki.—RICHARDSON, Ichth. China Japan, 1846, p. 244 (copied).—BLEEKER, Verh. Batav. Genootsch. (Japan), vol. 25, 1853, p. 15.

Amphacanthus margaritiferus (not VALENCIENNES) RICHARDSON, Ichth. China Japan, 1846, p. 243 (Canton).

Teuthis brevirostris GRAY, Cat. Fish. Gronow, vol. 2, 1854, p. 142. "Mediterranean," Indian Ocean, Red Sea.

Teuthis nigromaculata (DÖDERLEIN) STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Naturwiss. Kl., vol. 48, 1884, p. 25. Kagoshima (Name in text).

Brownish olive, with small scattered, roundish, white spots on back and sides, which much smaller than the interspaces between. Dark brown shoulder blotch about size of eye, less distinct with age. (Günther.)

Red Sea, East Indies, Philippines, China, Japan, Queensland, Micronesia.

SIGANUS PUNCTATISSIMUS new species

Diagnosis.—Distinguished among all the species of its genus by the very minute numerous gray or whitish dots, which extend on the base of the caudal fin. Reaches 285 mm.

Type.—Cat. No. 89979, U.S.N.M.

Type locality.—Masinloc Bay, Zambales.

Depth 2 to 2⅛; head 3⅓ to 3⅘, width 2 to 2⅛. Snout 2 to 2⅕ in head; eye 2¾ to 3⅓, 1¼ to 1¾ in snout, 1 to 1⅕ in interorbital; teeth about 32 in each jaw; maxillary 3⅓ to 4 in head; interorbital 2¾ to 3, broadly convex; preorbital, preopercle limb, opercle and scapular arch striate. Gill rakers 6+16, short, small, bifid points.

Scales very minute, ovoid, cycloid, 40 to 45 curculi. Cheek covered with small scales.

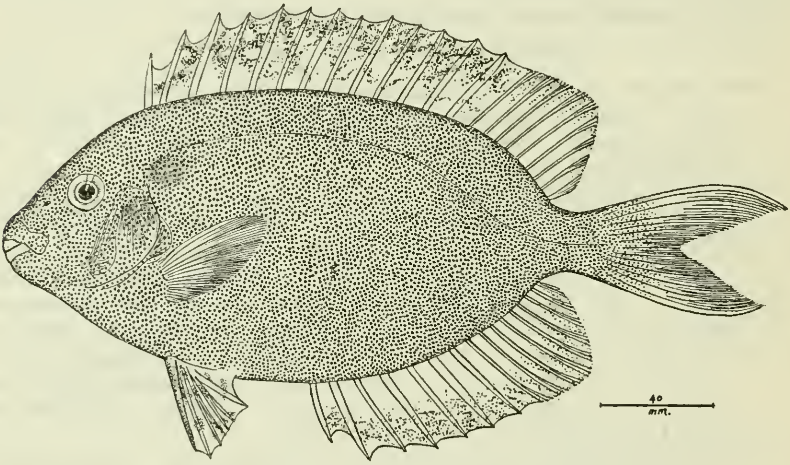

Fig. 25.—Siganus punctatissimus, new species

D. XIII, 10, I, fifth spine 1¾ to 1⅘ in head, third ray 1⅖ to 1½; A. VII, 9, I, third spine 1⅔ to 2, third ray 1½ to 1⅘; caudal deeply emarginate, lobes angularly pointed, 3 to 4 in combined head and body; least depth of caudal peduncle 3½ to 4½ in combined head and body; pectoral 1⅕ to 1¼; ventral 1¼ to 1½.

Body largely uniform deep brownish, everywhere with minute gray dots and extending on bases of soft vertical fins. Iris pale yellowish to olivaceous. Vertical fins brownish like general body color, only caudal base with pale dots. Pectoral dull olivaceous, uniform. Ventral pale, with brownish blotches. Young with dusky or blackish rounded blotch at shoulder, little less than eye, which also invaded by pale dots.

East Indian region. Bloch's figure of *Chaetodon guttatus* shows a species without spots on the head and those on the body greatly larger than in any of our specimens.

Possibly *Siganus capricornensis* Whitley,[9] from Northwest Islet, Queensland, may be this species, though we have not been able to consult the original account.

7573. Agojo Point, Catanduanes Island. June 10, 1909. Length 155 mm.

8960. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 219 mm.

8962. Between Paron and Jesus Points, Albay Gulf, Luzon. June 21, 1909. Length 218 mm.

7478. Bolalo Bay. December 21, 1908. Length 224 mm.

11478. Masbate reef, Masbate. April 26, 1908. Length 200 mm.

7243, 7244. Masinloc Bay, Zambales. November 23, 1908. Length 273 to 285 mm. Body seal brown above, lighter below. Each scale with small whitish spot. Fins largely like body color. Caudal with fine spots over its whole area except broad terminal margin. Pectorals hyaline. Type.

7966. Pagapas Bay, Luzon. February 20, 1909. Two examples. Length 213 to 218 mm.

11584. Port Uson, west of Pinas. December 17, 1908. Length 127 mm.

5705. Pujada Bay, Mindanao. May 10, 1908. Length 183 mm.

19917, 19918 [454, 453]. Romblon Harbor. March 25, 1908. Length 68 to 95 mm.

8086. Sacol Island. September 9, 1909. Length 177 mm.

22064. San Miguel Harbor, Ticao Island. April 21, 1908. Length 148 mm.

A613. Singaan Island. September 21, 1909. Length 223 mm.

A673, A674. Sitanki Reef. September 24, 1909. Length 229 to 233 mm.

A460, A466. Tulnalutan Island. September 9, 1909. Length 214 to 265 mm.

22640. Length 62 mm.

A1387, 22668. Labuandata Bay, Celebes. December 18, 1909. Length 145 to 233 mm.

14501, 19943. Gane Road, Gillolo Island. December 1, 1909. Length 147 to 180 mm.

A833, 18217. Talisse Island. November 9, 1909. Length 204 to 260 mm.

SIGANUS LABYRINTHODES (Bleeker)

Amphacanthus labyrinthodes BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 471. Batavia, Java.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 317 (copied).

Teuthis labyrinthodes BLEEKER, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 2, 1868, p. 275 (Obi).

Depth 2½ in total. Caudal emarginate. Red, with numerous undulated and reticulated transverse and longitudinal short blue lines. Vertical fins immaculate. (Günther.)

SIGANUS VERMICULATUS (Valenciennes)

Amphacanthus vermiculatus (KUHL and VAN HASSELT) VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 126. New Guinea, Java, Mauritius.—SCHLEGEL and MÜLLER, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 11, pl. 3, fig. 2 (Java Sea).—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 741 (Boeloekomba); vol. 5, 1853, p. 319 (Amboina); vol. 6, 1854, p. 517 (Oelakan); vol. 9, 1855, p. 259 (Siboga); vol. 13, 1857, p.. 479 (Prigi, Java); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, pp, 4, 31 (Manado); vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 2, No. 7, 1857; p. 5 (Amboina); vol. 3, No. 9, 1857–58, p. 4 (Trussan), p. 5 (Priaman) vol. 5, No. 8, 1858–59, p. 2 (Manado); vol. 8 (Sumatra), 1859, p. 10 (Priaman), p. 12 (Benculan); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 12, 1861, p. 31 (Singapore).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 326 (Ternate).

---

[9] Australian Zoologist, vol. 4, No. 4, 1926, p. 231, pl. 33.

Amphacanthus vermicularis Bleeker, Nat. Tijds. Nederland. Indië, vol. 17, 1858–59, p. 130 (Atapoepoe, Timor).—Beaufort, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 126 (Halmahera, Amboina).

Teuthis vermiculata Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 317 (Philippines, Amboina).—Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 152 (Batjan), p. 270 (Atapupu, Timor).—Day, Fishes of Malabar, 1865, p. 123.—Alleyne and Macleay, Proc. Linn. Soc. New South Wales, vol. 1, 1877, p. 339 (Trinity Bay, Queensland).—Day, Fishes of India, pt. 1, 1875, p. 166, pl. 40, fig. 1.—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Singapore).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (Manado, Celebes; Tabukan, Sangi).—Day, Fauna Brit. India, vol. 2, 1889, p. 88.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Luzon, Batangas, Nasugbu, Cavite, Santa Cruz).—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 425 (Ternate).

Teuthis vermiculatus Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 546 (Padang).

Siganus vermiculatus Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98 (Zamboanga, Bacon, San Fabian).—Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 248 (Zamboanga).—Seale, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 283 (Sandakan, Borneo).—Fowler, Copeia, No. 58, June 18, 1918, p. 64 (Philippines); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Orion, Bacon, Philippines).

Siganus shortlandensis Seale, Occas. Papers Bishop Mus., vol. 4, No. 1, 1906, p. 69, fig. 17. Shortland Island, Solomons.

Depth 1¾ to 2⅛; head 3⅕ to 4⅛, width 2 to 2⅛. Snout 2 to 2¼ in head; eye 2⅞ to 3⅞, 1⅛ to 1⅞ in snout, 1 to 1¼ in interorbital; teeth about 44 in each jaw; maxillary 3½ to 3⅔ in head; interorbital 2¾ to 3, broadly convex; preorbital, preopercle limb and scapular arch striate though striae rather imperfect. Gill rakers 6+19, short, flexible points.

Scales small, ovoid, cycloid, 60 to 138 circuli. Cheek more or less completely covered with small scales to preopercle ridge.

D. XIII, 10, i or 11, i, fifth spine 1⅘ to 2 in head, fourth ray 1⅓ to 1⅖; A. VII, 9, i, third spine 1⅞ to 2, third ray 1¼ to 1⅓; caudal lunate or moderately emarginate, 3½ to 3⅔ in combined head and body; least depth of caudal peduncle 3⅛ to 3¾ in head; pectoral 1⅙ to 1¼; ventral 1½ to 1⅔.

Generally deep brown or sienna, scarcely paler on under surface of head, breast and belly though latter all pale to whitish in very young. Iris brown. Entire head and body with vermiculating gray or gray-white lines, very numerous and convoluted in adults, but rather few and more or less longitudinal in young. Also with age vermiculations on belly become broken and more of fine speckled appearance. Fins all more or less brownish like back. Dorsal and anal spinous fins more or less clouded or shaded with deeper brown and all of soft vertical fins spotted with dusky, as cross bars in young, as numerous small spots with age, especially caudal. Paired fins brownish.

Mauritius, East Indies, Philippines, Melanesia. A well-marked, deep-bodied species, readily known by its vermiculated coloration. The very young are certainly similar to the young of *Siganus concatenatus*, but usually are distinguished entirely by their color pattern. This shows at least slight traces of a vermiculated design in the present species.

8937. Atulayan Island, Leyte Gulf. June 18, 1909. Length 225 mm.

Twelve examples. Bagaong River, 4 miles from mouth, Sablayan Bay, Mindoro. December 13, 1908. Length 28 to 47 mm.

Four examples. Below mouth of Mindanao River, Cotabato, Mindanao. May 20, 1908. Length 37 to 58 mm. The 2 larger approach somewhat the pattern of color of *Siganus concatenatus*, though the smaller are distinctly vermiculated.

19106 to 19108, 19110. Buena Vista, Guimaras Island. January 14, 1909. Length 90 to 109 mm.

One example. Cotabato, below mouth of Mindanao River, Mindanao. May 20, 1908. Length 55 mm.

5846. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 150 mm.

12814. Cavite and San Roque markets. June 27, 1908. Length 148 mm.

One example. Estero, Sablayan Bay, Mindoro. December 13, 1908. Length 78 mm.

17000, 17006. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 129 to 130 mm

A477. Isabela River, Basilan Island. September 11, 1909. Two examples. Length 205 mm.

7892. Mariveles River, Mariveles. January 30, 1909. Length 172 mm.

9637. Nato River, Luzon tidal. June 18, 1909. Length 200 mm.

5349. Nonucan River, Camp Overton, Mindanao. August 6, 1909. Length 87 mm.

7941. Pagapas Bay, Luzon. February 20, 1909. Length 250 mm.

11429, 11435 [1094]. Pucot River, Mariveles. January 29, 1909. Length 63 to 108 mm.

8694, 8695, 8703. San Miguel Island. June 4, 1909. Length 323 to 377 mm.

12638. Santiago River, Pagapas Bay, Luzon. February 20, 1909. Length 95 mm.

19874. Stream at Maagnas, Lagonoy Gulf, Luzon. June 17, 1909. Length 105 mm.

8320, 8321. Subig Bay, Subig. January 7, 1908. Length 115 to 120 mm.

A992. Togian Bay, Togian Island. November 19, 1909. Length 263 mm.

5072. Sandakan Bay, Borneo. February 9, 1908. Length 320 mm.

55950 U.S.N.M. San Fabian, Philippines. Bureau of Fisheries [4037]. Length 285 mm.

55962 U.S.N.M. Zamboanga. Bureau of Fisheries [3251]. Length 90 mm.

55971 U.S.N.M. Zamboanga. Bureau of Fisheries [3252]. Length 103 mm.

SIGANUS CORALLINUS (Valenciennes)

Amphacanthus corallinus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 139. Seychelles, Java.—SCHLEGEL and MÜLLER, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 10, pl. 2, fig. 2 (Batavia).—BLEEKER, Nat. Tijds.

Nederland. Indië, vol. 3, 1852, p. 740 (Macassar); vol. 5, 1853, p. 319 (Amboina); vol. 12, 1856, p. 230 (Batu Islands); Act. Soc. Sci. Ind. Néerland., vol. 3, No. 4, 1857–58, p. 3 (Manado); No. 5, 1857–58, p. 2 (Macassar).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 326 (Lombok, Macassar, Gisser).

Teuthis corallina Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 316 (Moluccas).—Bleeker, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 2, ser. 2, 1868, p. 284 (Solor).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 88 (Pelew Islands).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 4, 1885, p. 22 (Rubi, New Guinea).—Fowler, Journ. Acad. Nat. Sci. Philadelphia, vol. 12, ser. 2, 1904, p. 546 (Padang).

Teuthis corallinus Playfair, Fishes of Zanzibar, 1866, p. 50 (Seychelles).

Siganus corallinus Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Cagayancillo).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 69 (Philippines; Padang); Copeia, No. 58, June 18, 1918, p. 64 (Philippines).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 58 (Zamboanga; Padang).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Philippines).

?*Siganus fuscus* Griffith, Animal Kingd. Cuvier, vol. 10, Fishes, 1834, (p. 359) pl. 35. No locality.

Teuthis studeri Peters, Monatsber. Akad. Wiss. Berlin, 1876 (1877), p. 834. New Britain.

Teuthis gibbosus De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 461. Queensland Coast.

Teuthis teuthopsis De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 462. Queensland Coast.

Depth 2 to 2¼; head 3¼ to 3⅗, width 2 to 2¼. Snout 1⅘ to 2 in head; eye 3 to 4, 1⅔ to 2⅛ in snout, 1 to 1⅛ in interorbital; teeth about 32 in jaws; maxillary 4 to 4⅛ in head; interorbital 2¾ to 3⅒, broadly and slightly convex; preopercle flange, opercle and scapular arch striate. Gill rakers 4 + 18, short, cuneate points.

Scales minute, ovoid, cycloid, with 28 to 33 circuli, leaving rather long, entire median area. Cheek, excepting upper preorbital region, covered with numerous small scales; squamous area equally extensive in young.

D. XIII, 10, i, fifth spine 1⅔ to 2⅒ in head, fourth ray 1⅖ to 1⅔; A. VII, 9, i, third spine 1⅔ to 2, second ray 1¾ to 1⅞; caudal deeply forked, 2⅞ to 3¾ in combined head and body; least depth of caudal peduncle 3⅞ to 4⅛ in head; pectoral 1⅕ to 1⅓; ventral 1½ to 1⅗.

Light brown generally, head, trunk and tail everywhere with small light blue-gray ocelli bordered with deeper brown, variable and usually most distinct and largest on head and trunk anteriorly. Along breast, belly, and lower basal region of spinous anal, spots as bars or short lines with irregular or semi-waved appearance. Spots also extend out on caudal base somewhat and slightly on dorsals and anals in some examples. Iris pale yellowish. Fins all pale or light brownish generally, inclining to yellowish.

Seychelles, East Indies, Philippines, Riu Kiu, Micronesia. Our examples quite variable in the size and disposition of the spots on the body. In some they are very sparse over the body, scattered thinly over the trunk and tail, hardly any or none on the costal region. In others they may be exceedingly numerous, close-set and very small over the trunk and tail anteriorly. In young examples the spots are proportionately large and similar to those on the head. In all examples the spots are well developed, similarly large, crowded and conspicuous on the head.

Teuthis teuthopsis De Vis is based on an example about 202 mm. long and though its proportions do not altogether agree its color pattern seems applicable. It is said to have the lower part of the head, chest and fore part of the trunk with rather large, pale, dark-edged spots, most conspicuous on the opercle where they are disposed in descending series.

Teuthis gibbosus De Vis is apparently a variant of the less spotted form, based on an example 164 mm. It is noticed as rufous gray, redder on the back, nearly white on abdomen, throat and cheeks. Dark brown spots scattered on head and lower part of body and a few obscure pale spots on lower part of back.

1. Specimens with very numerous spots on body:

15407. Atulayan Island. June 18, 1909. Length 240 mm.
6510. Balikias Bay. July 17, 1908. Length 205 mm.
8360. Buang Bay, Talajit. May 15, 1909. Length 250 mm.
7279. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 160 mm.
8313. Lode Bay, Destacado Island. March 13, 1909. Length 228 mm.
9085. Malhou Island. July 27, 1909. Length 227 mm.
6588. Maricaban Island. July 21, 1908. Length 228 mm.
7239. Masinloc. Length 260 mm.
A110. Philippines. Length 252 mm.
A374. Philippines. Length 225 mm.
7258. Port Matalvi, Luzon. November 23, 1908. Length 253 mm. Dusky orange, spots pale blue, largest on head and breast. None on dorsal or caudal, few on anal.
6439. Tilig, Lubang. July 14, 1908. Length 277 mm.
A1368. Basa Island or reef, Celebes. December 17, 1909. Length 253 mm.
A939, A951, 13302, 14883. Dodepo and Pasejogo Islands, Celebes. November 16, 1909. Length 140 to 245 mm.
A873, 12789, 20037. Limbe Strait, Celebes. November 10, 1909. Length 138 to 220 mm. Spots dark blue, bord red with black on fading. Spines of dorsal, anal and ventral spotted, with ground color plain dusky yellow.
18496. Tana Keke Island, Celebes. December 21, 1909. Length 114 mm.
A1187. Gane Road, Gillolo Island. December 1, 1909. Length 223 mm.
A1108. Ternate market. November 26, 1909. Length 263 mm.
A1054. Tidore Island, south of Ternate. November 24, 1909. Length 235 mm.
A1230. Gomomo Island. December 3, 1909. Length 233 mm.
A1429. Kapoposang. December 28, 1909. Length 245 mm.
A1314. Labuan Blanda Island. December 14, 1909. Length 263 mm.
A1327. Tifu Bay. December 10, 1909. Length 260 mm.

2. Specimens with spots on trunk and tail in moderate or sparse numbers:

177709. Alimango Bay, Burias Island. March 5, 1909. Length 108 mm.
8363. Atulayan Island. June 18, 1909. Length 245 mm.
8637. Biri Channel. June 24, 1909. Length 298 mm.
7844. Busin Harbor, Burias Island. March 8, 1909. Length 210 mm.
7142, 7143, 7204. Cabugan Island, Hinunangan Bay, Leyte. July 30, 1909. Length 154 to 248 mm.
7799. Candaraman Island, Balabac. January 4, 1909. Length 233 mm.
15618 [1720]. Casogoran, Malhon Island. July 27, 1909. Length 164 mm. Spots on head posteriorly ocellate with centers bright blue and edges slate; rims darker on spots of lower head and breast.
7619. Cataingan Bay. April 17, 1908. Length 143 mm.
257 [1017]. Caxisigan Island, near Balabac. December 29, 1909. Length 198 mm. Blue spots on side of head and lower contour of body rather small, and on upper part of body very numerous and smaller than others.
13932. Cebu market. April 4, 1908. Length 182 mm.
5424, 13931. Cebu market. April 7, 1908. Length 146 to 180 mm.
8546. Cuyo Harbor. April 9, 1909. Length 250 mm.
12685. Endeavor Strait. December 23, 1908. Length 165 mm.
7280, 7383. Gigoso Point, Quinapundan Bay, Samar Island. July 28, 1909. Length 148 to 157 mm.
9482. Guntao Island. December 20, 1908. Length 228 mm.
11134. Lode Bay, Destacado Island. March 13, 1909. Length 223 mm. [1340].
5442, 5444, 7468, 7469. Maculabo Island. June 14, 1909. Length 176 to 190 mm.
6061. Mansalay, Mindoro Island. June 4, 1908. Length 278 mm.
6268. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 270 mm.
8890. Near Palag Bay, Luzon. June 16, 1909. Length 255 mm.
5921. Parang, Mindanao. May 23, 1908. Length 245 mm.
8001. Port Banalacan, Marinduque. February 23, 1909. Length 268 mm. Generally cadmium yellow, dusky orange on anterior and middle of body. Numerous blue spots on head, upper half of body anteriorly, breast, belly and along anal base; few on caudal peduncle at caudal base and row on each of last 3 or 4 anal spines; spots on head larger than those on body; none on fins, except as noted.
8181. Port Busin, Burias Island. March 7, 1909. Length 220 mm.
7380, 14371. Port Caltom, Busuanga Island. December 15, 1908. Length 133 and 245 mm.
6376. Port Jamelo. July 13, 1908. Length 242 mm.
10481. Port Maricaban. July 21, 1908. Length 138 mm.
7408. Port Uson, west of Pinas Island. December 17, 1908. Length 230 mm.
8784, 8788. Quinalasag Island. June 12, 1909. Length 265 to 278 mm.
22900 [498]. Romblon reef. March 26, 1908. Length 103 mm. Lemon yellow to olive with about 4 obscure dusky bars irregularly. Side of head, breast, shoulder and along anal base with small round blue spots. Fins like body color.
5586, 5587. San Miguel Harbor, Ticao Island. April 21, 1908. Length 205 to 215 mm.
9126. San Roque, Leyte Island. July 29, 1909. Length 285 mm.
16685. Surigao, Mindanao. May 8, 1908. Length 203 mm.
4931. Tataan, Tawi Tawi Group. February 20, 1908. Length 240 mm. Sides cadmium orange, with many small ultramarine round blue dots, slightly larger ventrally and pearl gray on breast. Shoulders, side of head and breast sulphur yellow, covered with rounded azure blue spots much larger than on body. Olive green on top of head, shading into yellow on snout. Spots not

apparent on chin or lips. Iris dark olive green to brown, included with dark area on top of head. Dorsal pale orange, lemon yellow on posterior base. Anal orange, spinous portion very pale; blue stripes and spots on sides of spines, these spots fusing into blotches and stripes along anal base. Lower part of caudal peduncle bluish drab. Caudal like dorsal, lemon yellow on caudal peduncle and base of crotch, both with blue spots. Pectoral dusky lemon yellow. Ventral very pale with slight orange tinge on front of spines.

5825. Tataidaga Point. May 15, 1908. Length 255 mm.

15426, 15427. Ulugan Bay near Rita Island. December 29, 1908. Length 180 to 192 mm.

A684. Bumbum Island. September 25, 1909. Length 237 mm.

21324. Great Tobea Island. December 15, 1909. Length 94 mm.

A1407. Tampotana Island. December 21, 1909. Length 248 mm.

84241 U.S.N.M. Zamboanga. Dr. Fred Baker. Two examples. Length 183 to 188 mm.

SIGANUS SUTOR (Valenciennes)

Amphacanthus sutor Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 148. Seychelles, Burbon, Malabar.—Bleeker, Verh. Batav. Genoot. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48.

Teuthis sutor Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 317 (copied).—Day, Fishes of Malabar, 1866, p. 126; Fishes of India, pt. 1, 1875, p. 167 (Playfair's example).—Klunzinger, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1. 1879, p. 393 (Port Darwin).—Day, Fauna Brit. India, vol. 2, 1889, p. 91, fig. 42.—Sauvage, Hist. Nat. Madagascar, Poiss., 1891, p. 289.

Siganus sutor Fowler, Bishop Mus. Bull., No. 22, 1925, p. 13 (Guam).

Buro brunneus (Commerson) Lacépède, Hist. Nat. Poiss., vol. 5, 1802, pp. 421, 422.

Teuthis margaritifera (not Valenciennes) Playfair, Proc. Zool. Soc. London, 1867, p. 855 (Seychelles).

Depth $2\frac{1}{8}$ to $2\frac{1}{5}$; head $3\frac{2}{5}$ to 4, width 2 to $2\frac{1}{8}$. Snout 2 to $2\frac{1}{5}$ in head; eye $2\frac{1}{3}$ to $4\frac{1}{6}$, 1 to $2\frac{1}{3}$ in snout, $1\frac{3}{4}$ in interorbital to greater than interorbital in young; teeth about 32 to 36 in each jaw; maxillary $3\frac{4}{5}$ to 4 in head; interorbital $2\frac{7}{8}$ to $3\frac{1}{10}$, broadly convex; opercle, preopercle limb, scapular arch and suborbitals striated finely, with opercle and suborbital nearly smooth in young. Gill rakers $5+16$, short, weak, cuneate points.

Scales minute, ovoid, circuli 70 to 120. Cheek covered with small scales, present also in young.

D. XIII, 10, i, fifth spine $1\frac{7}{8}$ to 2 in head, fifth ray $1\frac{2}{5}$ to $1\frac{2}{3}$; A. VII, 9, i, third spine $1\frac{5}{6}$ to 2, third ray $1\frac{1}{2}$ to 2, caudal emarginate in young, becoming deeply forked with slender pointed lobes with age, upper slightly longer, $2\frac{3}{5}$ to $3\frac{3}{5}$ in combined head and body, though shorter than head in young; least depth of caudal peduncle $3\frac{1}{8}$ to 4 in head; pectoral $1\frac{1}{5}$ to $1\frac{1}{3}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Back gray-brown, also upper surface of head. Whole head and body with very numerous thick-set gray-white spots, with age larger than reticulating darker interspaces though much more numerous, smaller and crowded on sides of abdomen and belly. Thus in young but 2 or 3 rows of pale spots on cheek, with age 6 or 7. Also on trunk and tail spots generally larger and fewer in young. Iris pale yellowish or gray-white. At suprascapula dusky blotch equal or little longer than eye and with pale border though body spots extend within its confines. Vertical fins largely dusky with age though thickly spotted with brown and most distinct in young examples. Pectoral pale or olivaceous. Ventral grayish with about 4 rows of dark blotches in young and clouded dusky, especially terminally, with age.

Bourbon, Seychelles, Malabar, Philippines. Possibly *Amphacanthus mertensii* Valenciennes[10] is this species which it is described as approaching in its small head. The brief original notice is condensed as follows:

D. XV, 10; A. VII, 10. Dull violet strewn with small and somewhat brilliant distinct orange dots. Caudal violet. Pectoral soiled orange and other fins reddish-gray. Length 204 mm.

13731. Alimango Bay, Burias Island. March 5, 1909. Length 200 mm.

331. Atulayan Island. June 18, 1909. Length 190 mm.

9490. Balalo Bay, Palawan Island. December 21, 1908. Length 218 mm.

6509. Balikias Bay. July 17, 1908. Length 292 mm.

16275, 21860. Biri Channel. June 1, 1909. Length 153 to 225 mm.

16870. Bisucay Island. April 9, 1909. Length 165 mm.

7821, 9356, 11635, 12203. Bugsuk, Balabac Island. January 5, 1909. Length 168 to 285 mm.

16458. Busin Harbor, Burias Island. April 22, 1908. Length 182 mm.

7843, 15695, 17692. Busin Harbor. March 8, 1909. Length 174 to 202 mm.

8795. Butauanan Island. June 12, 1909. Length 230 mm.

7868. Cagayan, Jolo. January 8, 1909. Length 323 mm.

4924. Casogoran, Malhon Island. July 27, 1909. Length 203 mm.

5425. Cebu market. April 7, 1908. Length 178 mm.

22136 [1907]. Cebu market. September 4, 1909. Length 113 mm.

7536, 7541, 7585. Endeavor Strait, Malampaya Sound, Palawan. December 23, 1908. Length 240 to 315 mm. (7541.) Smoky purple with bronzed spots and black shoulder blotch size of eye, but without golden blotch in dorsal axil. (7536.) Dark, speckled with white and black shoulder blotch larger than eye.

14496, 15524. Langao Point, Luzon. June 24, 1909. Length 185 to 198 mm.

8317, 11133. Lode Bay, Destacado Island. March 13, 1909. Length 214 to 290 mm.

8822, 8826. Maculabo Island. June 13, 1909. Length 310 to 319 mm.

21619. Makesi Island, Palawan. April 5, 1909. Length 139 mm.

6156, 6157. Mansalay, Mindoro. June 4, 1908. Five examples. Length 51 to 270 mm.

9048. Masbate Reef, Masbate. April 20, 1908. Length 163 mm.

6269. Medio Island, Galera Bay, Mindoro. June 9, 1908. Length 253 mm.

7940. Pagapas Bay, Luzon. February 20, 1909. Length 205 mm. Large round shoulder spot dark chocolate, margined with white circle. Spots on body light reddish-brown. Ground color lighter above pectorals and on shoulder.

8753. Parangpong Island. June 10, 1908. Length 374 mm.

8205. Port Busin, Burias Island. March 8, 1909. Length 278 mm.

---

[10] Hist. Nat. Poiss., vol. 10, 1835, p. 150. No locality (on figure by M. Mertens).—Kner, Reise Novara, Fische, 1865, p. 206 (Java).

7386. Port Caltom, Busuanga Island. December 15, 1908. Length 295 mm.
5757. Port Capunuypugan, Mindanao. May 10, 1908. Length 335 mm.
Four examples. Port Galera. June 9, 1909. Length 30 to 45 mm.
6377. Port Jamelo. July 13, 1908. Length 290 mm.
6572. Port Maricaban. July 21, 1908. Length 290 mm.
7259. Port Matalvi, Luzon. November 23, 1908. Two examples. Length 65 to 330 mm.
19815. Port San Vincente. November 18, 1908. Length 68 mm.
8000. Quinalasag Island. June 12, 1909. Length 359 mm.
8986. Rapu Rapu Island. June 22, 1909. Length 260 mm.
14757. Romblon. March 26, 1908. Length 130 mm.
5026. South Tumindao. February 26, 1908. Length 185 mm.
7840. Taganak Island. January 7, 1909. Length 330 mm.
7367. Tara Island. December 15, 1908. Length 290 mm.
4909. Tataan, Simaluc Island. February 19, 1908. Length 332 mm.
Eight examples. Varadero Bay, Mindanao. July 23, 1908. Length 32 to 43 mm.
A1369. Basa Island or Reef, Celebes. December 17, 1909. Length 310 mm.
A1474. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 258 mm.
A905. Limbe Strait, Celebes. November 10, 1909. Length 390 mm.
22851. Talisse Island. November 9, 1909. Length 104 mm.

SIGANUS ORAMIN (Schneider)

Amphacanthus guttatus var. *oramin* Schneider, Syst. Ichth. Bloch, 1801, p. 207, pl. 48. Tranquebar.

Amphacanthus oramin Weber, Siboga Exp., vol. 57, Fische, 1913, p. 329 (Flores and Obi major).

Teuthis oramin Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 318 (part; copied).—Day, Fishes of India, pt. 1, 1875, p. 168, pl. 40, fig. 6.—Boulenger, Proc. Zool. Soc. London, 1887, p. 659 (Muscat).—Day, Fauna Brit. India, vol. 2, 1889, p. 91, fig. 42.—Steindachner, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 425 (Patani River, Halmaheira; Ternate).—Pellegrin, Bull. Soc. Zool. France, vol. 30, 1905, p. 84 (Baie d'Along, Tonkin); Bull. Mus. Hist. Nat. Paris, vol. 13, 1907, p. 203 (Tuléar, Madagascar).—Regan, Ann. Durban Mus., 1908, p. 246 (Kosi Bay).—Pellegrin, Bull. Soc. Zool. France, vol. 39, 1911, p. 227 (Diégo Suarez, Mahambo and Ft. Dauphin, Madagascar).—Johnstone, Rep. Pearl Fish. Manaar, vol. 2, 1914, p. 217 (south of Cheval Paar).

Siganus oramin Jordan and Seale, Proc. U. S. Nat. Mus., vol. 28, 1905, p. 789 (Negros).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Aparri, Cavite).—Barnard, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 785, pl. 31, fig. 4 (Natal, Zululand).

Amphacanthus dorsalis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 143. Batavia.—Schlegel and Müller, Verhand. Nat. Ges. Nederland., Zool., 1839–44, pp. 10, 13, pl. 2, fig. 1 (Batavia).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 161 (Timor, Kupang), p. 235 (Amboina), p. 237 (Wahai), p. 546 (Amboina), p. 690 (Wahai), p. 717 (Goessongassam); vol. 4, 1853, p. 132 (Ternate), p. 596 (Halmaheira); vol. 6, 1854, p. 375 (Anjer), p. 457 (Amboina); vol. 7, 1854, p. 227 (Macassar), p. 313 (Bantun, Anjer), p. 361 (Batjan); vol. 8, 1855, p. 306 (Batoe), p. 393 (Amboina); vol. 12, 1856, p. 215 (Nias); vol. 13, 1857, p. 332 (Batavia, Bantam, Anjer, Samarang; Sumatra; Nias; Batu; Banka; Celebes; Ternate; Batjan; Amboina; Ceram; Timor), p. 384 (Batjan); vol. 15, 1858, p. 242 (Singapore); vol. 18, 1859, p. 354 (Bawean); vol. 20, 1859-60, p. 203 (Karangbollong), p. 206

(Boleling, Bali); vol. 21, 1860, p. 138 (Muntok, Banka); vol. 22, 1860, p. 108 (Muntok).—Bleeker, Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 3, No. 5, 1857–58, p. 2 (Macassar); vol. 3, No. 9, 1857–58, p. 6 (Siboga); vol. 8 (Sumatra), 1859, p. 12 (Benculen).

Teuthis dorsalis Cantor, Journ. Asiat. Soc. Bengal (Cat. Malay Fish.), vol. 18, pt. 2, 1849, p. 1191 (Pinang).—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 318 (Pinang).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Singapore).

Teuthis albopunctatus (not Schlegel) Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 318 (part).

Depth 2½ to 2⅗; head 3⅞ to 4⅕, width 2 to 2⅛. Snout 2⅓ in head; eye 3⅛ to 3⅘, 1¼ to 1⅖ in snout, 1 to 1⅓ in interorbital; teeth about 40 in each jaw; maxillary 3⅞ to 4 in head; interorbital 2⅘ to 3¼, broadly convex; opercle and preopercle limb striate, scapular arch nearly smooth. Gill rakers 4 + 18, short, cuneate points, small, spinescent.

Scales minute, ovoid, cycloid, circuli 45 to 68. Cheek with only anterior half rather sparsely with small scales, much fewer and anterior in young.

D. XIII, 10, I, fifth spine 2⅒ to 2⅕ in head, fifth ray 2⅕ to 2⅓; A. VII, 9, I, third spine 2 to 2⅓, third ray 2½ to 3⅒; caudal deeply forked, lobes slender and sharp, 3⅓ to 3¾ in combined head and body; least depth of caudal peduncle 4½ to 5 in head; pectoral 1¼ to 1⅖; ventral 1⅔ to 1¾.

Back heliotrope purple fading to gray-white below. Whole back and upper surface of head finely spotted or blotched paler, markings more or less irregular, though ensuing reticulating areas subequal with size of markings. Iris pale or yellowish-white. Dorsals, anals and caudal pale brownish, former blotched with dusky brown irregularly and rays of soft fins with brown spots; in young caudal with 6 or 7 transverse deep brown bands. Pectorals pale uniform yellowish. Ventrals whitish, with dusky cloudings more or less as 4 or 5 dusky blotches in young.

Arabia, Natal, Madagascar, India, East Indies, Philippines.

Our smaller examples show a tendency to longitudinal streaks on lower sides, the reticulations breaking. We have compared this with Schneider's figure and believe it to be the same. Günther says "the black cross-bands on the caudal fin, perhaps, have been added by Bloch," but our smaller specimens show them distinctly, much as in Schneider's figure.

Day[11] under *Teuthis oramin* says "in specimens over 7 or 8 inches in length . . . the white spots decrease in number and have a blue tinge. The shoulder spot becomes dark, but the spot on the upper edge of the eye remains. The black shoulder spot has been omitted in Bl. Schneider's figure, which otherwise is not incorrect; when freshly captured the bars across the caudal fin are very distinct." To this we take exception, in that our specimens appear to never have had a dark shoulder spot and the white or pale spots on the body are greatly more numerous with age. It is therefore quite evident that both Günther and Day did not have Schneider's fish.

---

[11] Fishes of India, pt. 1, 1875, p. 168, pl. 40, fig. 6.

15264, 15403. Atulayan Island. June 18, 1909. Length 188 to 240 mm.

6307. Bugsuk Island, Balabac. January 5, 1909. Length 192 mm.

A527. Bulan Island. September 13, 1909. Length 305 mm.

A581. Busbus Point, Siasi Island. September 20, 1909. Length 280 mm.

9822. Cagayan, Sulu Island. January 8, 1909. Length 228 mm.

9949, A1523, A1524, 14270 [2181]. Doc Can Island, Sulu Sea. January 7, 1909. Length 177 to 248 mm. Generally olivaceous fading to greenish yellow, back with rather smoky purplish wash. Side of head brighter greenish yellow, with 3 distinct purplish stripes under eye and parallel with lower limb of preopercle. Top of head with ground color showing as brownish yellow spots in broad network of very dusky violet, nearly violet black. Side under and above pectoral extended with vertical lines of smoky purplish, below and behind forming regular network. On back ground color appears as spots in more regular broad network of purplish, somewhat as on top of head. Dorsal olivaceous, rays with pale spots. Anal like dorsal, markings less distinct. Caudal rather olivaceous, more or less clouded with purplish basally. Pectoral very pale hyaline yellow. Ventral dusky and whitish.

A492. Isabela River. September 11, 1909. Length 270 mm.

10552. Jolo. March 7, 1908. Length 240 mm.

15525. Langao Point, Luzon. June 24, 1909. Length 243 mm.

A487, A488, 12242 [1919]. Lampinigan Island. September 11, 1909. Length 205 to 220 mm. General color of head and side purplish, reticulations enclosing olive areas fading to sulphur yellow; larger on back where about ⅓ of pupil diameter and on lower side ¼ of pupil. Breast and belly slaty drab, without spots. Spinous dorsal and anal hyaline, more or less mottled with darker; rays of soft fins spotted with pale and dark olive. Caudal more dusky. Pectoral pale yellow. Ventral like spinous dorsal.

9158, 9159, 7969. Little Santa Cruz, Zamboanga. May 26, 1908. Length 183 to 290 mm.

9296 to 9298. Murcielagos Bay. August 9, 1909. Length 238 to 277 mm.

12565, 12566, 17326, 20299, 20300. Near Palag Bay, Luzon. June 16, 1909. Length 183 to 235 mm.

7967. Pagapas Bay, Luzon. February 20, 1909. Length 214 mm. Very dark brown, fading purplish above and white below, then showing numerous brassy or sulphur yellow spots about size of number 12 shot, somewhat larger at side medianly then lower disappearing; spots show very dimly through brown before fading. Three horizontal purplish stripes cross cheek merging in ground color on hind portion of head, upon which numerous rather larger spots. Fins show no markings, color like body; membranes of soft fins hyaline. Pectoral rays hyaline yellow.

4891. Siasi Island, Jolo. February 17, 1908. Length 160 mm. "Banis" (Moro). Generally pale purplish blue, darker above. Back and sides with faint yellow lines, spots and vermiculations. Apparent line at base of soft dorsal violet. Dorsal rays and spines pale greenish, membranes anteriorly with greenish mottling, posteriorly hyaline. Caudal pale green, with 6 greenish cross-bars, darkest on upper and lower fin margins. Anal like dorsal. Pectoral pale yellow. Ventral rays bluish white, membranes mottled green and white.

A462. Tulnalutan Island. September 9, 1909. Length 275 mm.

11689. Tutu Bay, Jolo Island. September 19, 1909. Length 153 mm.

A1513, A1514. Birabirahan Island, Borneo. December 31, 1909. Length 262 to 300 mm.

A715. Si Amil Island. September 27, 1909. Length 257 mm.

A1473. Kait Point, Libani Bay, Celebes. December 29, 1909. Length 287 mm.

A892. Limbe Strait, Celebes. November 10, 1909. Length 264 mm. Ground color slate bluish on fading. Numerous small round bronzed spots about size of number 8 shot cover top and back of head as well as body except breast and belly, fusing more or less into stripes on cheek and lower opercle and blotches somewhat on back anteriorly. Dorsal and anal olivaceous or dusky on rays, membranes hyaline. Caudal more or less purplish. Pectorals very pale hyaline straw. Ventrals slate or gray, like body.

SIGANUS ROSTRATUS (Valenciennes)

Amphacanthus rostratus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 158. Massauah, Red Sea.—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 503 (type).

Teuthis rostrata Playfair, Fishes of Zanzibar, 1866, p. 50, pl. 10, fig. 2 (Zanzibar).—Günther, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 89, pl. 60 (Pelew Islands, Society Islands, Gilbert Islands).—Klunzinger, Fische Roth. Meer., 1884, p. 76.—Steindachner, Denks. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 71, 1907, p. 140 (Gischin, South Arabia).

Siganus rostratus Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Fuga).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa).—Fowler and Bean, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 58 (Zamboanga).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1923, p. 42 (Madagascar); Bishop Mus. Bull., No. 22, 1925, p. 34 (Samoa).

Teuthis oligostictus Kner, Sitz. Ber. Akad. Wiss. Wien, vol. 58, 1868, pp. 30, 345, pl. 7, fig. 23. Kanathia, Viti Islands, Fiji.

Teuthis vitianus Sauvage, Bull. Soc. Philomath. Paris, vol. 6, ser. 7, 1882, p. 173. Fiji.

Siganus fuscescens (not Houttuyn) Seale and Bean, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).—Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 26, No. 7, 1911, p. 313 (Kusaie, Caroline Islands).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa, Riu Kiu).

Siganus punctatus (not Schneider) Kendall and Goldsborough, Mem. Mus. Comp. Zool., vol. 26, No. 7, p. 313 (Makemo, Paumotus).

Depth 2½ to 2⅔; head 4¼ to 4⅓, width 1⅘ to 1⅞. Snout 2⅖ to 2⅘ in head; eye 3 to 3⅘, 1⅓ to 1¾ in snout, 1 to 1½ in interorbital; about 30 teeth in each jaw; maxillary 3⅔ to 3¾ in head; interorbital 2⅞ to 3; opercle, preopercle limb and humeral arch with rather feeble striae. Gill rakers 6 + 20, short, flexible.

Scales very minute, ovoid elongate, cycloid, circuli about 30 to 35. Cheek entirely naked, or with only small patch of scales behind maxillary or sometimes a few scattered scales in young.

D. XIII, 10, I, fourth spine 1⅔ to 2⅕ in head, third ray 1⅞ to 2; A. VII, 9, I, third spine 1⅞ to 2⅛, second ray 2⅕ to 3; caudal deeply emarginate, lobes sharply pointed and upper longer, 3½ to 3⅔ in combined head and body; least depth of caudal peduncle 4 to 5 in head; pectoral 1¼ to 1⅓; ventral 1½ to 1⅗.

Body largely dull brown, often paler below, irregularly clouded or even obscurely mottled in some examples, again more or less uniform. Vertical fins brown, often with darker shades on spinous portions. Paired fins paler brownish, usually with 3 to 5 transverse dusky blotches or bands across ventrals. Young often show all fins more or less mottled or blotched darker. Iris pale brownish.

Red Sea, Zanzibar, Philippines, Formosa, Riu Kiu, Melanesia, Micronesia, Polynesia.

This species is known by its elongate form and largely uniform color pattern. According to Günther, the body is finely mottled with deep golden, this fading after the fish is placed in alcohol. The scaleless cheek is usually a distinctive character.

6368, 10553. Jolo Island, Jolo. March 7, 1908. Length 138 to 168 mm.
9160. Little Santa Cruz. May 26, 1908. Length 202 mm.
21812. Pandanon Island. March 24, 1909. Length 50 mm.
7681. Ulugan Bay, Palawan. December 28, 1908. Length 202 mm.
A1578. Soo Wan, Eastern Formosa. January 29, 1910. Length 335 mm.
52502 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Length 252 mm.
58050 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Two examples. Length 175 to 188 mm. As *Siganus fuscescens.*
65660. U.S.N.M. Mangareva. *Albatross* collection. Length 163 mm.
66031. U.S.N.M. Kusaie. *Albatross* collection. Two examples. Length 135 to 150? mm. As *Siganus fuscescens.*
66032 U.S.N.M. Paumotus. *Albatross* collection. Length 351 mm. As *Siganus punctatus.*
71601 U.S.N.M. Nafa, Okinawa, Riu Kiu Islands. *Albatross* collection 1906. Length 135 mm. As *Siganus fuscescens.*
72008 U.S.N.M. Nafa. *Albatross* collection, 1906. Length 118 mm.
82909 U.S.N.M. Fiji. Wilkes Exploring Expedition. Length 203 mm.
84245 U.S.N.M. Zamboanga. Dr. Fred Baker. Four examples. Length 138 to 163 mm.

SIGANUS TUMIFRONS (Valenciennes)

Amphacanthus tumifrons VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 159. Shark's Bay, West Australia; Siam.

Teuthis tumifrons GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 317 (copied).—BLEEKER, Nederland. Tijds. Dierk., vol. 2, 1865, p. 174 (Siam).

Depth 3½ in total. Snout rather broad, convex. Caudal emarginate. Purple brown, dotted all over with very small whitish or bluish dots which extend on dorsal and anal. Caudal brown. Pectoral yellow. Ventral varied brown and white. Length 153 mm. (Valenciennes.)

SIGANUS CANALICULATUS (Mungo Park)

Chaetodon canaliculatus MUNGO PARK, Trans. Linn. Soc. London, vol. 3, 1797, p. 33. Sumatra.

Amphacanthus canaliculatus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 580 (Padang); Act. Soc. Ind. Néerland., vol. 3, No. 9, 1857–58, p. 4 (Trussan, Sumatra).—JOUAN, Mém. Soc. Imp. Sci. Nat. Cherbourg, vol. 3, ser. 2, 1868, p. 267 (Hong Kong).

Teuthis canaliculata GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 316 (copied).

Teuthis canaliculatus Fowler, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 546 (Padang).

Siganus canaliculatus Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Orani, Orion, Bacon, San Fabian, Philippines).

Amphacanthus margaritiferus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 145. Amboina, Vanicolo.—Schlegel and Müller, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 10 (Vanikoro).—Richardson, Ichth. China Japan, 1846, p. 243 (Canton).—Bleeker, Journ. Indian Arch., vol. 2, 1848, p. 638 (Bima, Sumbawa); Verh. Batav. Genoot. (Nal. Ichth. Japan), vol. 25, 1853, p. 15; Nat. Tijds. Nederland. Indië, vol. 13, 1856, p. 193 (Ternate), p. 334 (Batavia, Biliton, Bali, Batu, Celebes, Ternate); vol. 15, 1858, p. 200 (Goram Island), p. 242 (Singapore); vol. 17, 1858–59, p. 130 (Atapoepoe, Timor); vol. 20, 1859–60, p. 141 (Badjoa, Boni); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 5, 1856, p. 6 (Amboina); vol. 3, No. 3, 1857–58, p. 3 (Kiosio), p. 6 (Japan).

Amphacanthus margaritifer Bleeker, Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado).

Teuthis margaritifera Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 317 (East Indies).—Bleeker, Nederland. Tijds. Dierk., vol. 1, 1863, p. 254 (Wahai, Ceram), p. 270 (Atapupu, Timor).—Day, Fishes of India, pt. 1, 1875, p. 167, pl. 40, fig. 5.—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Singapore).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 4, 1885, p. 22 (Manado, Celebes).—Day, Fauna Brit. India, vol. 2, 1889, p. 90.—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Cebu).

Theutis margaritifera Steindachner, Sitz. Ber. Akad. Wiss. Wien, vol. 60, Heft 1, 1870, p. 565 (Singapore).

Siganus fuscescens (not Houttuyn) Evermann and Seale, Bull. Bur. Fisher., vol. 26, 1906 (1907), p. 90 (Bacon and San Fabian).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 69 (Philippines, Bacon); Copeia, No. 58, June 18, 1918, p. 64 (Philippines).

Resembles *Siganus punctatissimus* in its general color pattern but the light dots not so numerous and the body more elongate.

Seychelles, India, East Indies, Melanesia, China, Japan. Mungo Park's original account describes the color as greenish yellow above with white dots. Günther, quoting Bleeker, gives the forehead and snout with transverse blue streaks, which may be some other species.

SIGANUS PUNCTATUS (Schneider)

Amphacanthus punctatus Schneider, Syst. Ichth. Bloch, 1801, p. 210. Pacific Ocean [Tonga and New Caledonia] (on Forster).—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 146 (Pacific Ocean).

Siganus punctatus Jordan and Seale, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 360 (Apia and Pago Pago).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa).

Harpurus inermis (Forster) Lichtenstein, Descript. Animal., 1844, p. 286. Nanock Island, New Caledonia.

Amphacanthus hexagonatus Bleeker, Nat. Tijds. Nederland. Indië, vol. 6, 1854, p. 518. Cocos Keeling Islands; vol. 7, 1854, p. (38) 41 (Cocos); vol. 8, 1855, p. 445 (Cocos); vol. 9, 1855, p. 114 (Sumbawa); vol. 20, 1859–60, p. 331 (Amboina); Verslag. en Mededeel. Kon. Akad. Wet. Amsterdam, vol. 12, 1861, p. 31 (Singapore).—Kner, Reise Novara, Fische, 1865, p. 207 (Sydney).—Weber, Siboga Exp., vol. 57, Fische, 1913, p. 328 (Sailusketjil, Gisser, Saleyer, Rotti).

Teuthis hexagonata GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 320 (Fiji); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 89 (Fiji and Samoa).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Singapore).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (Manado, Celebes; Rubi; New Guinea).—ELERA, Cat. Fauna. Filipin., vol. 1, 1895, p. 529 (Cebu).

Siganus hexagonata SEALE, Philippine Journ. Sci., vol. 5, No. 4, 1910, p. 284 (Sandakan, Borneo).

Blue, with hexagonal golden dots standing densely together, covering head, body and vertical fins.

East Indies, Philippines, Melanesia, Polynesia.

30627 U.S.N.M. New Guinea. Australian Museum. Length 272 mm. Depth 2⅛. Caudal deeply forked, lobes pointed. Ground color brown, with close-set small round spots all over trunk and on vertical fins, becoming very small and numerous on rayed portions terminally. Spots on head larger and less crowded than on trunk.

52494 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Three examples of similar size to above, which appear to agree.

SIGANUS GUTTATUS (Bloch)

Chaetodon guttatus BLOCH, Naturg. Ausl. Fische, vol. 3, 1787, p. 55, pl. 196. Japan.—LICHTENSTEIN, Descript. Animal., 1844, p. 286 (Tonga and New Caledonia).

Amphacanthus guttatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 136 (no locality).—BLEEKER, Verh. Batav. Genoot. (Madura), vol. 22, 1849, p. 5 (Kammal); Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 53 (Singapore); vol. 5, 1853, p. 154 (Macassar); vol. 6, 1854, p. 457 (Amboina); vol. 7, 1854, p. 226 (Macassar); vol. 9, 1855, p. 282 (Macassar); vol. 10, 1856, p. 347 (Rio, Bintang); vol. 12, 1856, p. 193 (Ternate), p. 230 (Batu); vol. 13, 1857, p. 56 (Kajeli, Buru), p. 372 (Sangi); vol. 15, 1858, p. 242 (Singapore); vol. 18, 1859, p. 361 (Blinju, Banka); vol. 19, 1859, p. 333 (Karangbollong, Java); vol. 22, 1860, p. 113 (Buru); Verh. Batav. Genootsch. (Nal. Ichth. Bengal), vol. 25, 1853, p. 48; Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado), p. 8 (Macassar); vol. 3, No. 4, 1857–58, p. 3 (Manado, Tanawanko); vol. 3, No. 5, 1857–58, p. 2 (Macassar); vol. 3, No. 9, 1857–58, p. 2 (Padang, Sumatra), p. 4 (Trussan); No. 8, 1858–59, p. 2 (Manado, Celebes).—KNER, Reise Novara, Fische, 1865, p. 207 (Java and Pujuipit).

Teuthis guttata GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 320 (compiled).—BLEEKER, Verslag. en Mededeel. Kon. Akad. Wet. Amsterdam, ser. 2, vol. 2, 1868, p. 291 (Rio, Bintang); Nederland. Tijds. Dierk., vol. 1, 1863, p. 240 (Obi).

Amphacanthus chrysospilos BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. (53) 66. Singapore.

Amphacanthus melanospilus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 7, 1854, p. 431. Batavia.

Depth 2½ to 3 in total. Caudal emarginate. Reddish. Head clouded with reddish-gray. Body, caudal and bases of dorsal and anal densely spotted with reddish-brown. (Günther.)

Reaches 305 mm. according to Valenciennes. Possibly the imperfectly described *Amphacanthus firmamentum* Valenciennes[12] may have been intended for this species. It is noticed as follows:

---

[12] Hist. Nat. Poiss., vol. 10, 1835, p. 142. Samarang.

D. XIII, 10; A. VII, 9; caudal little emarginate. Back blue, paler below, everywhere strewn with numerous orange-brown spots. Front and opercle greenish. Cheeks with 3 oblique lines with yellowish intervals. Fins gray, end of dorsal with oval green spot. Length 152 mm.

The two nominal forms, *Amphacanthus chrysospilos* Bleeker and *Amphacanthus melanospilus* Bleeker, seem to be the present species. Both are said to have deeply emarginate caudal fins and the proportions given are more or less similar. The former is said to be blue, dotted markedly with golden, with its length 292 mm. The latter is said to have dark spots though with some golden ones intermixed, and its length is 368 mm.

SIGANUS NOTOSTICTUS (Richardson)

Amphacanthus notostictus Richardson, Ann. Mag. Nat. Hist., London, vol. 11, 1853, p. 172. Port Essington.

Teuthis notosticta Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 320 (type).—Károli, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Yokohama).

Depth little over 3 in total. Caudal subtruncate. Light brownish olive. Body with brown spots, which smaller than interspaces and confluent on back into short, narrow, vermiculated streaks. (Günther.)

SIGANUS STELLATUS (Forskål)

Scarus stellatus Forskål, Descript. Animal., 1775, pp. x, 26. Djedda, Red Sea.

Amphacanthus stellatus Schneider, Syst. Ichth. Bloch, 1801, p. 209 (Red Sea).—Rüppell, Neue Wirbelth., Fische, 1835, p. 130.—Klunzinger, Verh. Zool. bot. Ges. Wien, vol. 21, 1871, p. 503 (Red Sea).

Teuthis stellata Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 320 (Red Sea Ceylon).—Playfair, Fishes of Zanzibar, 1866, p. 50 (Zanzibar).—Day, Fishes of India, pt. 1, 1875, p. 168.—Klunzinger, Fische Roth. Meer., 1884, p. 76.—Day, Fauna Brit. India, vol. 2, 1889, p. 92.

Theutis stellata Düncker, Mitth. Naturh. Mus. Hamburg, vol. 21, 1903 (1904), p. 159 (Singapore).

Amphacanthus punctatus (not Schneider).Rüppell, Atlas Reise Nördlich. Afrika, Fische, 1828, p. 46, pl. 11, fig. 2 (Red Sea).

Amphacanthus nuchalis Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 140 (on Forskål and Rüppell).

Depth 3 in total. Caudal forked. Grayish, covered all over with brown spots, larger than interspaces. Greenish yellow spot at front of dorsal. (Günther.)

According to Klunzinger reaches 320 mm.

SIGANUS FUSCESCENS (Houttuyn)

Sparus fuscescens Houttuyn, Verh. Holland. Maatsch. Haarlem, vol. 20, 1782, p. 333. Japan.

Amphacanthus fuscescens Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 156 (Japan).—Schlegel, Fauna Japon., Poiss., dec. 7–9, 1845, p. 127, pl. 68, fig. 1 (Nagasaki).—Richardson, Ichth. China Japan, 1846, p. 244 (Canton).—Bleeker, Verh. Batav. Genoot. (Nal. Ichth. Japan), vol. 25, 1853,

p. 15; vol. 26 (Nal. Ichth. Jap.), 1857, pp. 5, 106 (Nagasaki); Nat. Tijds. Nederland. Indië, vol. 20, 1859–60, p. 235 (Nagasaki).—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 394 (Yokohama).

Teuthis fuscescens GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 321 (copied).—BLEEKER, Nederland. Tijds. Dierk., vol. 2, 1865, p. 31 (Manila Bay).—KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, vol. 80, Heft 1, 1879, p. 393 (Queensland).—KÁROLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 158 (Canton, Yokohama, Singapore).—STEINDACHNER and DÖDERLEIN, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 48, 1884, p. 25 (Tokyo).—FRANZ, Abh. Bayer. Akad. Wiss., vol. 4, Suppl. vol. 1, 1910, p. 50 (Yokohama, Aburatsubu).

Siganus fuscescens JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 560 (Tokyo, Yokohama, Misaki, Wakanoura, Kobe, Onomichi, Hakuta, Kawatana, Nagasaki).—JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 35 (Cavite; Panay).—EVERMANN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98 (Bacon, Jolo).—SEALE, Philippine Journ Sci., vol. 5, No. 4, 1910, p. 284 (Sandakan, Borneo).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 423 (Tokyo, Shimizu), p. 511 (Okinawa).—FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 58 (Cebu, Philippines).—FOWLER, Bishop Mus. Bull., No. 22, 1925, p. 13 (Guam); Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Santa Maria, Vigan, Calapan).

Teuthis albopunctatus (not SCHLEGEL) GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 88 (Pelew Islands, Howland Island).

Depth 2⅖ to 2⅗; head 3½ to 4⅛, width 2 to 2⅛. Snout 2⅓ to 2½ in head; eye 2⅞ to 3⅕, 1⅕ to 1⅓ in snout, equals or greater than interorbital; teeth about 38 to 40 in each jaw; maxillary 3⅓ to 4 in head; interorbital 3 to 3⅛, broadly convex; preopercle limb, opercle and scapular arch with fine, inconspicuous striae. Gill rakers 5 + 17, short, small, cuneate points.

Scales very minute, ovoid, cycloid, circuli 50 to 60. Cheek usually with but a very few small scattered scales, frequently entirely naked.

D. XIII, 10, I, fifth spine 1¾ to 2 in head, third ray 1⅘ to 2; A. VII, 9, I, third spine 1⅞ to 2⅛, third ray 2½ to 2⅗; caudal deeply emarginate, 3¼ to 3¾ in combined head and body; least depth of caudal peduncle 3⅞ to 4¾ in head; pectoral 1¼ to 1⅓; ventral 1⅔ to 1¾.

Back and upper surfaces ecru-drab to dull brown, below gray-white to white. Back and head above and sides, also sides of body variably though finely spotted with whitish, and spots always smaller in size than dark interspaces. Frequently spots much smaller about edge of back. Often lower surface may be dusky, especially in small examples, when spots are much larger than on flanks or back. None of spots extend on fins. Iris pale or yellowish-white. Most examples, especially darker ones, show 2 or 3 dark transverse bars or bands across chin or lower surface of head. No distinct dark humeral or shoulder blotch. Fins all pale or very light brownish. Spinous dorsal with irregular brownish cloudings which on soft fin confined to rays as several brown blotches to each. Anals similar. Caudal pale with 5 or 6 dark gray transverse bands, usually faded in large specimens or only marginal above and below. Pectoral pale or light brown, uniform. Ventrals more or less gray-white to whitish, usually with several deep or dusky-brown blotches.

India, East Indies, Philippines, China, Japan. Similar to *Siganus oramin* in the elongate body, but with fine white spots usually sharply defined and the caudal fin less forked. We follow Günther in the statement: "No brown spot on the shoulder." Day says "a dark oval shoulder mark" and also figures the same. We find it largely or usually in the young of our specimens though seldom in large examples. Our materials are very variable; often the entire general color may be clouded with darker, sometimes even with dusky spots here and there or between the white ones. In young examples the vertical fins are frequently speckled with dusky.

One example. Atulayan Bay, Luzon. June 17, 1909. Length 41 mm.

20133. Bacoor, Luzon market. June 15, 1908. Length 108 mm.

20487. Bataan Island, tide pool. June 5, 1909. Length 34 to 44 mm. Two examples.

One example. Bataan Island, tide pool. July 22, 1909. Length 20 mm.

6776. Beach at village near Chase Head, Endeavor Strait, Palawan Island. December 22, 1908. Length 218 mm.

Eleven examples. Below mouth of Mindanao River, Cotabato, Mindanao. May 20, 1908. Length 43 to 72 mm.

20588. Bohol Island. April 9, 1908. Length 62 mm.

18477, 19769. Bolalo Bay, Palawan Island. December 21, 1908. Length 50 to 143 mm.

5669, 5672, 5677. Busin Harbor, Burias Island. April 23, 1908. Length 240 to 255 mm.

11707, 11708. Cagayan, Sulu Island. January 8, 1908. Length 208 to 240 mm.

20262. Cataingan Bay, Masbate. April 18, 1908. Length 50 to 128 mm. Three examples.

16956, 16957. Catbalogan, Samar. April 15, 1908. Length 198 to 200 mm.

17485, 22206. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 46 to 165 mm. Six examples.

5997 [742]. Cavite market. December 1, 1908. Length 109 mm.

12815, 12816. Cavite and San Roque markets. June 27, 1908. Length 106 to 119 mm.

5314, 18361, 18362. Cebu market. April 4, 1908. Length 126 to 244 mm.

7548 to 7550, 7552 to 7555, 10684, 10685, 12883, 12884. Cotabato, Mindanao. May 20, 1908. Length 80 to 143 mm.

Ten examples. Cotabato, below mouth of Mindanao River, Mindanao. May 20, 1908. Length 45 to 103 mm.

5841, 21344, 22876, 22878. Davao, Mindanao. May 16, 1908. Length 31 to 215 mm.

Ten examples. 20586, 20587. East side Tagbilaran Strait, Bohol Island. April 9, 1908. Length 56 to 62 mm.

17004, 17015. Galvaney Island, Ragay Gulf, Luzon. March 9, 1909. Length 108 to 122 mm.

13814, 13815. Guijulugan, Negros Island. April 2, 1908. Nineteen examples. Length 24 to 153 mm.

4798. Jolo market, Jolo. February 8, 1908. Length 244 mm. Bright olive yellow over dusky, brightest on back and top of head, fading white below. Dusky median streak on breast. Sides of back with small, irregular, citron-yellow spots about size of number 12 shot above, become finer on top of head and coarser on sides below, latter more white. Iris silvery with dusky shades. Greenish line under eye. Dorsal dusky olive-green, with irregular white mottling on membranes and soft dorsal with yellowish tinge, rays with spots. Anal like dorsal. Caudal dusky, with slight yellowish shade. Pectoral hyaline, with yellowish dusky shade. Ventral with spines and first ray white, other rays and membranes dusky.

4846. Jolo market. February 11, 1908. Length 238 mm.

9827. Little Santa Cruz Island, Zamboanga. May 26, 1908. Length 210 mm.

11240, 19822. Mactan Island, Cebu. March 25, 1909. Length 140 to 147 mm.

6775. Malanipa Island. April 29, 1909. Length 228 mm.

7419, 7421, 8825. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 208 to 263 mm.

Three examples. Manila Bay. December 9, 1907. Length 18 to 25 mm.

20095. Manila market. July 11, 1908. Length 148 mm.

7294, 7303, 19615, 19616. Mansalay, Mindoro. June 4, 1908. Length 46 to 163 mm. Six examples.

6215. Mantaquin Bay, Palawan Island. April 2, 1909. Length 103 mm.

One example. Masamat Bay, Quinalasag Island, eastern Luzon. June 11, 1909. Length 21 mm.

9333. Murcielagos Bay, Mindoro. August 20, 1909. Two examples. Length 226 to 228 mm.

15851. Nabatas Point, Samar Island. July 24, 1909. Length 190 mm.

Seven examples. North end of Endeavor Strait, northwest coast of Palawan. December 22, 1908. Length 45 to 93 mm.

15752. Opol, Mindanao. August 4, 1909. Five examples. Length 103 to 189 mm.

Twelve examples. Pandanon Island. March 23, 1909. Length 27 to 43 mm.

Four examples. Pandanon Island. March 24, 1909. Length 26 to 48 mm.

19930. Parang, Mindanao. May 23, 1908. Length 208 mm.

One thousand and fifty examples. Port Bais anchorage, by electric light. March 31, 1908. Length 23 to 28 mm. All faded pale.

7387. Port Caltom, Busuanga Island. December 15, 1908. Length 225 mm.

Eleven examples. Port Galera. June 9, 1908. Length 27 to 61 mm.

10514, 18692, 18693. Port Jamelo, Luzon. July 13, 1908. Length 110 to 203 mm.

Four examples. Port Matalvi, Luzon. November 23, 1908. Length 54 to 98 mm.

19778. Ragay Bay, Ragay Gulf. March 10, 1909. Length 48 mm.

One example. Reef opposite Cebu, Cebu. April 5, 1908. Length 23 mm.

One example. Reef opposite Cebu. April 7, 1908. Length 33 mm.

14966. Refugio Island, Pasacao, Luzon. March 9, 1909. Length 73 mm.

19453. River at Pasacao, Luzon. March 9, 1909. Length 77 mm.

10583. San Fernando Port. May 10, 1909. Length 154 mm.

5497. San Jaunico Strait, Leyte. April 13, 1908. Length 168 mm.

22383. San Miguel Bay. June 14, 1909. Length 80 mm.

20328. San Pascual Island, tide pool. March 8, 1909. Length 32 to 92 mm. Three examples.

9124, 11314, 11315. San Roque, Leyte Island. July 29, 1909. Length 140 to 238 mm.

20242. San Roque market. June 13, 1908. Length 138 mm.

13807, 13808. Santa Cruz Island, Marinduque. April 24, 1908. Length 84 to 137 mm.

8811, 9558, 9559, 9560 [1154], 21668 to 21670. Santiago River, Pagapas Bay. February 20, 1909. Length 97 to 175 mm. Soiled slaty gray, becoming whitish below. Numerous elongate elliptical spots on sides, become round on top of head and along dorsal base, also much smaller above, all dusky white in color. Fresh examples show yellowish-olive shades, spots appearing through with slight tendency to dusky margins so as somewhat ocellate. Vertical fins with dusky clouds and blotches. Pectoral hyaline with slight yellowish shade. Ventral clouded dusky.

20623 to 20625. Sirinao Island near Alfonso XIII. December 30, 1908. Length 135 to 168 mm.

17546. Sorsogan market. March 12, 1909. Length 168 mm.

One example. Subig Bay, Luzon. Dr. P. Bartsch. Length 20 mm.

4358. Sulade Island. September 17, 1909. Length 63 mm.

Five examples. Sulade Island. September 18, 1909. Length 28 to 35 mm. (D. 5553).

Thirteen examples. Surigao, Mindanao. May 5, 1908. Length 28 to 67 mm.

Three examples. Taal anchorage. February 20, 1909. Length 29 to 31 mm.

11942. Tacloban market, Leyte. April 12, 1908. Length 135 mm.

16273. Teomabal Island. September 13, 1909. Length 190 mm.

Six examples. Tutu Bay. September 19, 1909. Length 11 to 33 mm. (D. 5562).

Four examples. Ulugan Bay in island north of Oyster Inlet. December 28, 1908. Length 61 to 152 mm.

17720. Varadero Bay, Mindoro. July 23, 1908. Length 52 to 228 mm. Five examples.

5972. Zamboanga market. May 26, 1908. Length 260 mm.

19340. Sandakan Bay, Borneo. March 2, 1908. Length 59 mm.

A875. Limbe Strait, Celebes. November 10, 1909. Length 234 mm.

13593, 18110. Tana Keke Island, Celebes. December 21, 1909. Length 185 to 204 mm.

A1186, 19942. Gane Road, Gillolo Island. December 1, 1909. Length 174 to 208 mm.

11149. Hakuho, Soo Wan, Formosa. January 29, 1910. Length 183 mm.

20342. Kowlan, China. September 12, 1908. Length 113 mm.

12637 U.S.N.M. Zanzibar. British Museum. Two examples. Length 59 to 101 mm.

22578 U.S.N.M. Miuramisaki, Japan. Japanese Government. Length 345 mm.

30615 U.S.N.M. New Guinea. Australian Museum. Length 119 mm.

30626 U.S.N.M. New Guinea. Australian Museum. Length 137 mm.

41553 U.S.N.M. Samoa. Dr. C. H. White. Length 148 mm.

43945 U.S.N.M. Mauritius. Col. Nicholas Pike. Seven examples. Length 125 to 180 mm.

49511 U.S.N.M. Yokohama. September, 1899. U. S. Fish Commission. Length 118 mm.

52041 U.S.N.M. Southern Negros, Philippines. Dr. Bashford Dean. 1901. Four examples. Length 80 to 160 mm.

52111 U.S.N.M. No locality. Senff Expedition. Length 158 mm.

55948 U.S.N.M. Jolo, Philippines. Bureau of Fisheries [3518]. Length 222 mm.

55953 U.S.N.M. Bacon, Philippines. Bureau of Fisheries [3851]. Length 33 to 43 mm. One hundred and seventy-seven examples.

55974 U.S.N.M. Bacon. Bureau of Fisheries [3924]. Length 125 mm.

56283 U.S.N.M. Iloilo, Philippines. G. A. Lung. Two examples. Length 60 to 71 mm. As *Siganus oramin.*

57555 U.S.N.M. Japan. P. L. Jouy. Length 200 mm.

59695 U.S.N.M. Kagoshima. Dr. H. M. Smith. Two examples. Length 138 to 140 mm.

59959 U.S.N.M. Clarence River. D. G. Stead. Length 245 mm. As *Siganus nebulosus.*

66033 U.S.N.M. Suva, Fiji. *Albatross* collection. Length 55 mm. As *Siganus rostratus.*

70999 U.S.N.M. Shinizu, Japan. *Albatross* collection. Six examples. Length 90 to 148 mm.

71130 U.S.N.M. Tokyo market. *Albatross* collection. Length 235 mm.

75907 U.S.N.M. Borneo. H. C. Raven. Length 233 mm.

SIGANUS LURIDUS (Rüppell)

Amphacanthus luridus (Ehrenberg) Rüppell, Atlas Reise nördl. Afrika, Fische, 1828, p. 45. Tor, Red Sea.—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 150 (Massuah).—Guichenot, Notes I. Réunion, vol. 2, 1862, p. 27.—Kner, Reise Novara, Fische, 1865, p. 207 (Nicobars).—Klunzinger, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 503 (Koseir, Red Sea).

Teuthis lurida Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 321 (Red Sea).—Klunzinger, Fische Roth. Meer, 1884, p. 75.—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (Cebu).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Cebu).—Steindachner, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., vol. 71, 1907, p. 140 (Makall, South Arabia).

Differs from *Siganus fuscescens* in color. According to Klunzinger this is greenish, dark above. Yellowish longitudinal line on lower half of head and body, which diffusely marbled with dark spots and oblique bands. Fins dark, dorsal rays yellow. Caudal with vertical rows of dark spots. Pectoral greenish yellow.

Red Sea and Nicobars. Listed by Elera from Cebu.

SIGANUS ARGENTEUS (Quoy and Gaimard)

Amphacanthus argenteus Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 368, pl. 62, fig. 3. Mariannes, Guam.—Valenciennes, Hist. Nat. Poiss. vol. 10, 1835, p. 161 (Mariannes, Guam).—Weber, Siboga Exp., vol. 57' Fische, 1913, p. 330 (Biaru Island).

Teuthis argentea Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 322 (Mariannes); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 90 (locality?).—Elera, Cat. Fauna Filipin., vol. 1, 1895, p. 531 (Lúzon, Batangas, Nasugbu).

Depth 4 in total. Silvery, back brownish. Originally described from an example 54 mm. long.

82913 U.S.N.M. Fiji. Wilkes Exploring Expedition. Length 55 mm.

SIGANUS LINEATUS (Valenciennes)

Amphacanthus lineatus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 130, pl. 286. Vanicolo and New Guinea.—Whitley, Records Austral. Mus., vol. 16, No. 4, March 28, 1928, p. 231 (Moreton Bay, type of *Teuthis flava* and *Siganus aurolineatus*, Murray Island, Thursday Island, Pellew Group Cape Wessel; Vanikoro).

Teuthis lineata Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 322 (copied)

Siganus lineatus Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 35 (Manila).—Evermann and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98 (Bacon).—Jordan and Richardson, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Cuyo).—Snyder, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa).

Siganus aurolineatus Ogilby, Mem. Queensland Mus., vol. 1, 1912, p. 56. Somerset, North Queensland.

Teuthis flava De Vis, Proc. Linn. Soc. New South Wales, vol. 9, 1884 (1885), p. 462. No locality.—Kent, Great Barrier Reef, 1893, p. 286 (Queensland).

Depth 2¼; head 3⅔, width 2. Snout 1⅞ in head; eye 3⅙, 1¾ in snout, 1⅙ in interorbital; teeth about 46 in each jaw; maxillary 3⅓ in head; interorbital 2⅔, broadly convex; preopercle limb, suprascapular arch and opercle feebly striate. Gill rakers 6 + 16, short, flexible points.

Scales minute, ovoid elongate, cycloid, 86 to 108 circuli. Cheek more or less entirely covered with small scales to preopercle ridge.

D. XIII, 10, I, fourth spine 2⅙ in head, third ray 1⅖; A. VII, 9, I, third spine 2⅒, second ray 1⅖; caudal evenly emarginate, 1; least depth of caudal peduncle 3⅕; pectoral 1¼; ventral 1⅗.

Back dull brownish generally, sides and below white. Below lateral line about a dozen parallel longitudinal pale blue-gray bands wide as interspaces and each with brown border line; many of bands joined or anastomose in places; bands also continue on head, but more or less obliquely; above lateral line become greatly irregular, often forming vermiculations, arcs, spots, etc. Iris yellowish, brownish externally. Fins all dull or drab brown, rayed vertical ones with scattered or obscure deeper brown spots or blotches. Below last rays of soft dorsal pale to neutral blotches on tail above.

Compared with the original figure our specimen differs a little, likely a condition of age. It shows more horizontal bands and the spots on the soft vertical fins are more indistinct. It seems quite likely that *Siganus aurolineatus* Ogilby is based on a half-grown example.

1296. No locality, likely Philippines?
1891. Length 303 mm.

SIGANUS SPINUS (Linnaeus)

Sparus spinus Linnaeus, Syst. Nat., ed. 10 vol. 1, 1758, p. 281. East Indies.—Osbeck, Reise Ost. China, 1765, p. 357 (China).—Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 471.—Bonnaterre, Tabl. Ichth., 1788, p. 103 (East Indies).—Gmelin, Syst. Nat. Linn., vol. 1, pt. 3, 1789, p. 1278 (East Indies).—Walbaum, Arted. Pisc., vol. 3, 1792, p. 291 (on Linnaeus).—Forster, Fauna Indica, 1795, p. 15.

Amphacanthus marmoratus Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 367, pl. 62, figs. 1–2. Guam.—Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 124 (Mariannes; Java).—Bleeker, Nat. Tijds. Nederland Indië, vol. 10, 1856, p. 360 (Ternate); vol. 11, 1856, p. 95 (Banda), p. 489 (Ceram); vol. 12, 1856, p. 193 (Ternate); vol. 13, 1857, p. 56 (Kajeli, Buru), p. 478 (Karangbollong), p. 479 (Prigi, Java); vol. 14, 1857, p. 245 (Prigi); vol. 15, 1858, p. 200 (Goram); vol. 16, 1858, p. 209 (Batjan);

vol. 17, 1858–59, p. 143 (Boleling; Bali); vol. 19, 1859, p. 331 (Patjitan, Java), p. 333 (Karangbollong); vol. 22, 1860, p. 245 (Batoesendi, Bawean), p. 249 (Timor); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, pp. 4, 31 (Manado); vol. 3, No. 4, 1857–58, p. 3 (Manado); vol. 3, No. 9, 1857–58, p. 4 (Trussan); vol. 5, No. 8, 1858–59, p. 2 (Tobariri, Celebes).—KNER, Reise Novara, Fische, 1865, p. 207 (Tahiti).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 327 (Manado and Banda).

Teuthis marmorata BLEEKER, Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 14, 1862, p. 97 (Ternate); ser. 2, vol. 2, 1868, p. 276 (Batjan); vol. 2, ser. 7, 1873, p. 36 (Aru Islands).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 322 (Borneo).—BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 254 (Wahai, Ceram); vol. 1, 1863, p. 270 (Atapupu, Timor); vol. 3, 1866, p. 42, (Harouko).—GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 90 (Carolines and East Indies).—STEINDACHNER, Abh. Senckenb. Naturf. Ges., vol. 25, 1900, p. 426 (Ternate).

Siganus marmoratus JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 35 (Manila).—JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Calayan).—SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa).—FOWLER, Copeia, No. 58, June 18, 1918, p. 64 (Philippines); Bishop Mus. Bull., No. 22, 1925, p. 12 (Guam).

Amphacanthus guamensis VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 163. Guam.

Amphacanthus scaroides BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 262. Priaman and Cauer, Sumatra; vol. 6, 1854, p. 90 (Banda Neira), p. 204 (Timor Kupang), p. 517 (Oelakan, West Sumatra).

Teuthis striolata GÜNTHER, Cat. Fish. Brit. Mus., vol 3, 1861, p. 319. Aneiteum, New Hebrides; Journ. Mus. Godeffroy, vol. 2–3, Heft 4–5, 1874, p. 89, pl. 59, fig. A (New Hebrides, Solomons, Samoa, Friendly Islands, Society Islands).—BEAUFORT, Bijd. Dierk., Amsterdam, vol. 19, 1913, p. 125.

Siganus rostratus (part) JORDAN and SEALE, Bull. Bur. Fish., vol. 25, 1905 (1906), p. 360 (Apia).

Siganus tetrazonus (not BLEEKER) SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa, Riu Kiu).

Depth 2½ to 2⅔; head 3½ to 4⅙, width 1⅞ to 2. Snout 2⅓ to 2½ in head; eye 3 to 3½, 1⅛ to 1¼ in snout, equal to or greater than interorbital; teeth about 35 in each jaw; maxillary 3⅕ to 3⅓ in head; interorbital 2⅞ to 3, very slightly elevated and also with slight median depression; preorbital, preopercle flange, opercle and scapular arch striate. Gill rakers 5 + 16, short, weak points.

Scales small, ovoid, cycloid, 20 to 48 circuli. Cheek largely covered with small scales, often naked strip above and below along preopercle ridge.

D. XIII, 10, I, fifth spine 1¾ to 2 in head, third ray 1½ to 1⅔; A. VII, 9, I, third spine 1¾ to 2⅛, third ray 2 to 2⅛; caudal 1⅛ to $1\frac{1}{10}$, slightly emarginate; least depth of caudal peduncle 4 to 5; pectoral 1⅛ to 1⅓; ventral 1⅖ to 1½.

Body dull brown, pale to whitish below. Back and sides marked with vermiculating lines of gray more or less as reticulations. Iris grayish yellowish-white. Vertical fins brown, spinous portions clouded with dusky and on rayed portions each ray with several brown blotches. Pectoral pale uniform brown. Ventral grayish with 4 series of deep brown blotches.

East Indies, Philippines, Riu Kiu, Melanesia, Micronesia, Polynesia. Jordan and Seale contend that *Siganus striolatus* is distinct as "in the type of *striolatus* the fins are said to be immaculate." We do not think this distinction can be of any value as Günther's types were two stuffed specimens. Anyone familiar with old dried fish specimens knows that the brown blotches on the rays, as in a species of the present type, could readily fade out and appear immaculate. In our young examples the pale lines often have a more hexagonal reticulated appearance, several dark large blotches on the dorsals and anals, often 2 dark brown bands across chin with posterior narrower, double broad brown band across breast and another across belly behind ventral fins. Variably brown bands may be formed as 5 blotches along bases of anals. In the very young these blotches give the fish much the appearance of being cross banded, the rest of the fins white or immaculate and the bands extending out to the fin edges of the spinous portions.

Forty-four examples. Atulayan Bay, Luzon. June 17, 1909. Length 36 to 80 mm.
19768, 19770. Bolalo Bay, Palawan. December 21, 1908. Three examples. Length 59 to 83 mm.
11998, 11999, 16044, 17141, 17142. Cabugan Island, Hinunangan Bay, Leyte Island. July 30, 1909. Length 134 to 163 mm.
11338, 11339. Cebu market. April 4, 1908. Length 103 to 108 mm.
22135. Cebu market. September 4, 1909. Length 90 mm.
One example. Cebu market. September 3, 1909. Length 38 mm.
19274. Inamucan Bay, Mindanao. Length 112 mm.
5971, 9165, 9166, 12809, 12810, 22238. Little Santa Cruz, Zamboanga. May 26, 1908. Length 130 to 218 mm.
20389. Maculabo Island. June 14, 1909. Length 75 mm.
Six examples. Mahinog, Camiguin Island. August 3, 1909. Length 36 to 85 mm.
Four examples. Mansalay, Mindoro. June 4, 1908. Length 45 to 53 mm.
20356, 20357. Nasugbu, Luzon. January 16, 1908. Length 83 mm.
Fifty-nine examples. Olangapo (over ship's side). January 7, 1908. Length 21 to 25 mm.
One example. Opol, Mindanao Island. August 4, 1909. Length 123 mm.
Two examples. Pancol. December 25, 1908. Length 35 to 42 mm.
Six examples. Port Caltom. December 15, 1908. Length 67 to 92 mm.
One example. Port Galera. June 9, 1908. Length 35 mm.
Four examples. Reef opposite Cebu. April 7, 1908. Length 21 or 22 mm.
Five examples. Subig Bay. January 7, 1908. Length 22 to 25 mm.
13349. Suragao Point, Luzon. June 24, 1909. Length 158 mm.
21787. Tara Island. December 15, 1908. Length 75 mm.
16260. Teomabal Island. September 18, 1909. Length 120 mm.
19372. Ulugan Bay, Palawan Island. December 29, 1908.
8356, 8357. Reefs in Apra Bay, Guam. November 19–21, 1907. Length 80 to 104 mm.

One example (D. 5598). October 12, 1909. Length 24 mm.

Three examples. Apia, Samoa. Bureau of Fisheries. Length 77 to 210 mm. As *Siganus rostratus.*

32735 U.S.N.M. Indian Archipelago. Leiden Museum. Length 111 mm.

52352 U.S.N.M. Apia, Samoa. Bureau of Fisheries. Four examples. Length 73 to 260 mm.

57952 U.S.N.M. Zamboanga. Dr. E. A. Mearns. Three hundred and thirty-four examples. Length 20 to 26 mm.

71588 U.S.N.M. Nafa, Okinawa, Riu Kiu Islands. Twenty-three examples. Length 45 to 58 mm. *Albatross* collection, 1906. As *Siganus tetrazonus.*

71920 U.S.N.M. Nafa. *Albatross* collection. Length 167 mm.

72009 U.S.N.M. Japan. Bureau of Fisheries. Two examples. Length 82 mm.

82911 U.S.N.M. Fiji. Wilkes Exploring Expedition. Length 85 to 150 mm. Four examples.

83255 U.S.N.M. No locality. Wilkes Exploring Expedition.

SIGANUS RIVULATUS (Forskål)

Scarus rivulatus FORSKÅL, Descript. Animal., 1775, pp. x, 25. Arabia.

Scarus siganus FORSKÅL, Descript. Animal., 1775, p. 25. Arabia. (Alternate name for *Scarus rivulatus*).—BONNATERRE, Tabl. Ichth., 1788, p. 94 (Red Sea).

Amphacanthus siganus RÜPPELL, Atlas Reise nördl. Afrika, Fische, 1828, p. 44, pl. 11, fig. 1 (Tor); Neue Wirbelth., Fische, 1835, p. 130.—VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 152 (Suez, Tor, Massuah).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 327 (Bima, Siau).

Amphacanthus sigan KLUNZINGER, Verh. zool. bot. Ges. Wien, vol. 21, 1871, p. 502 (Red Sea).

Teuthis sigana GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 322 (copied).

Teuthis sigan KLUNZINGER, Fische Roth. Meer., 1884, p. 75.

Amphacanthus nebulosus QUOY and GAIMARD, Voy. Uranie, Zool., Jan. 29–May 26, 1925, p. 370. Sydney Bay, Port Jackson.—VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 164 (Timor, Mariannes, Port Jackson).—WHITLEY, Rec. Australian Mus., vol. 16, No. 4, March 28, 1928, p. 232 (Queensland; New South Wales; types of *Siganus consobrinus*).

Teuthis nebulosa GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 321 (Sydney, type of *Amphacanthus gymnopareius*, Australia).—PLAYFAIR, Fishes of Zanzibar, 1865, p. 51, pl. 10, fig. 3 (Aden, Zanzibar, Johanna Island).—GÜNTHER, Philos. Trans. Roy. Soc. London, vol. 168, 1879, p. 470 (Rodriguez).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (North Celebes; Kordo Mysore).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 529 (Luzon, Manila, Cebu).—REGAN, Journ. Bombay Nat. Hist. Soc., vol. 16, pt. 2, 1905, p. 330 (Persian Gulf).—GILCHRIST and THOMPSON, Ann. South African Mus., vol. 11, pt. 2, 1911 p. 37 (Natal).

Siganus nebulosus FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1925, p. 253 (Delagoa Bay).—BARNARD, Ann. South Afric. Mus., vol. 21, pt. 2, Oct. 1927, p. 785 (East London, Natal, Delagoa Bay).

Amphacanthus maculosus QUOY and GAIMARD, Voy. Uranie, Zool., Jan. 29–May 26, 1825, p. 370. Sydney Bay, Port Jackson.

Amphacanthus abhortani VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 143. Mauritius.—SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p. 288, pl. 35, fig. 7 (type).

Amphacanthus olivaceous VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 163. Mauritius.

Amphacanthus gymnopareius RICHARDSON, Ann. Mag. Nat. Hist., London vol. 11, 1843, p. 174. Port Essington.

Teuthis albopunctatus (not Schlegel) Alleyne and Macleay, Proc. Linn. Soc. New South Wales, vol. 1, 1877, p. 338 (Cape Grenville).—Macleay, Proc. Linn. Soc. New South Wales, vol. 5, 1881, p. 443 (on Günther).—Kent, Great Barrier Reef, 1893, p. 286.

Siganus consobrinus Ogilby, Mem. Queensland Mus., vol. 1. 1912, p. 54, pl. 13. Moreton Bay.

Known chiefly by its color which olivaceous with several irregular, diffuse, yellowish longitudinal lines and diffuse brownish cross bands. Body and fins often clouded or spotted with darker.

Red Sea, Zanzibar, Madagascar, Mauritius, Rodriguez, Natal, East Indies, Philippines, Queensland, New South Wales, Micronesia.

SIGANUS TETRAZONUS (Bleeker)

Amphacanthus tetrazona Bleeker, Nat. Tijds. Nederland. Indië, vol, 8, 1855, p. (436) 441. Manado, Celebes.

Teuthis tetrazona Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 323 (copied).

Siganus tetrazonus Jordan and Seale, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 35 (Manila).

Yellow, with 4 pairs of undulated brownish bands across back.

SIGANUS DOLIATUS (Valenciennes)

Amphacanthus doliatus Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 132. Buru and Vanicolo; Règne Animal Cuvier, Poiss., Ill. 1839, pl. 71, fig. 1 (Moluccas).—Bleeker, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. (596) 605 (Ternate); vol. 7, 1854, p. 361 (Batjan).—Kner, Reise Novara, Fische, 1865, p. 209 (Pujuipat Island).

Siganus doliatus Guérin, Iconogr. Poiss., 1829–44, pl. 35, fig. 1 (Buru).

Teuthis doliata Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 323 (copied); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 90 (New Hebrides, Pelew Islands, Fiji, Ponape).—Meyer, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 21 (Rubi, New Guinea).

Depth 2 to $2\frac{1}{8}$; head $3\frac{3}{5}$ to $3\frac{2}{3}$, width 2 to $2\frac{1}{8}$. Snout 2 to $2\frac{1}{10}$ in head; eye 3 to $3\frac{3}{5}$, $1\frac{2}{5}$ to $1\frac{3}{4}$ in snout, 1 to $1\frac{1}{8}$ in interorbital; teeth about 40 in each jaw; maxillary 3 to $3\frac{3}{4}$ in head; interorbital $2\frac{1}{2}$ to $2\frac{7}{8}$, broadly convex; preorbital, preopercle limb, opercle and scapular arch striate. Gill rakers $5+17$, short, bifid cuneate.

Scales small, ovate, cycloid, circuli fine though rather imperfect, 30 to 40. Cheek largely covered with small scales.

D. XIII, 10, I, fifth spine $1\frac{3}{4}$ to $1\frac{7}{8}$ in head, fourth ray $1\frac{1}{4}$ to $1\frac{1}{2}$; A. VII, 9, I, third spine $1\frac{3}{4}$ to $1\frac{4}{5}$, third ray $1\frac{2}{3}$ to $1\frac{3}{4}$; caudal emarginated moderately or lunate, $3\frac{1}{5}$ to $3\frac{1}{2}$ in combined head and body; least depth of caudal peduncle $3\frac{2}{3}$ to $3\frac{3}{4}$ in head; pectoral $1\frac{1}{10}$ to $1\frac{1}{8}$; ventral $1\frac{3}{5}$ to $1\frac{3}{4}$.

Back brown, pale or light grayish below. Head above with vermiculate bluish lines, often transverse across front and sometimes may extend on opercle below; usually on opercle oblique blue lines all sloping backward toward gill-opening. On side of breast number of longitudinal gray lines. On side about 30 vertical blue lines all close-set and parallel and behind longitudinal blue lines extend on caudal peduncle. Iris brownish. Fins all brownish, spinous fins with brown blotches.

East Indies, Melanesia, Micronesia, Polynesia. Very closely related to *Siganus virgatus* and only distinguished by the increased vertical blue lines on the flanks.

A1128. Makyan Island. November 29, 1909. Two examples. Length 192 to 213 mm.

A1106. Makyan Island. November 28, 1909. Length 255 mm.

A853. Talisse Island. November 9, 1909. Length 248 mm.

A1165. Gane Road, Gillolo Island. December 1, 1909. Length 195 mm.

A1059. Tidore Island, Dutch East Indies. November 24, 1909. Length 228 mm. Brown ocular and shoulder bands. Ground color yellow, with blue stripes, vertical stripes continuous from gill opening to below middle of soft dorsal, slightly vermiculated below dorsal. Horizontal lines only on caudal peduncle and extreme posterior body. Lower surface of body from level of middle of pectoral to axil of anal silvery white. Base of pectoral to throat with 3 or 4 orange and slaty stripes. Forehead and snout with cross bars of yellow and blue and also striped portion of side of head. Spinous dorsal olivaceous or orange, bright yellow on soft dorsal. Caudal yellow. Anal pale hyaline orange. Pectoral dusky. Ventral colorless.

30572 U.S.N.M. New Guinea. Australian Museum. Length 203 mm.

SIGANUS PUELLUS (Schlegel)

Amphacanthus puellus SCHLEGEL, Bijdr. Dierk., vol. 1, 1852, p. 39, fig. 2. East Indies.—BLEEKER, Act. Soc. Sci. Ind. Néerland., vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Macassar).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 329 (Gisser).

Teuthis puella GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 323 (copied).—BLEEKER, Nederland. Tijds. Dierk., vol. 1, 1863, p. 249 (Flores); Verslag. en Mededeel. Akad. Wet. Amsterdam, vol. 16, 1864, p. 368 (Aru Islands, Moluccas).—GÜNTHER, Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 91 (Apamana; Pelew Islands).

Amphacanthus cyanotaenia BLEEKER, Nat. Tijds. Nederland. Indië, vol. 4, 1853, p. 606. Ternate, Amboina; vol. 5, 1853, p. 319 (Amboina); vol. 6, 1854, p. 90 (Banda, Neira); vol. 8, 1855, p. 296 (Ternate); vol. 9, 1855, p. 106 (Sahu, Halmaheira); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 8 (Macassar).

Amphacanthus ocularis THIOLLIÈRE, Fauna Woodlark, 1857, p. 178. Woodlark Island.

Siganus zoniceps SEALE, Occas. Papers Bishop Mus., vol. 4, No. 1, 1906, p. 69, fig. 18. Shortland Island.

Siganus marmoratus (part) SNYDER, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 511 (Okinawa, Riu Kiu).

Depth 2¼ to 2½; head 3 to 3⅘, width 2⅙ to 2⅘. Snout 2 to 2⅛ in head; eye 3 to 3⅖, 1⅕ to 1¾ in snout, 1 to 1¼ in interorbital; teeth 30 to 32 in each jaw; maxillary 3⅓ to 4⅕ in head; interorbital 2⅞ to 3¼, broadly convex; opercle, scapular arch and preopercle limb with striae. Gill rakers 4 + 17, short points.

Scales minute, ovoid, cycloid, circuli 60 to 90. Cheek scaled to preopercle ridge.

D. XIII, 10, I, fifth spine 2⅛ to 2⅒ in head, fifth ray 1⅗ to 1⅔; A. VII, 9, I, fifth spine 1⅞ to 2, second ray 1⅗ to 2⅛; caudal emarginate, well forked with age, 3⅖ to 3⅘ in combined head and body; least depth of caudal peduncle 3⅔ to 5 in head; pectoral 1¼ to 1⅓; ventral 1⅗ to 1⅘.

Back and upper surfaces brown, below gray-white to white. Brown band crosses chin, then up behind maxillary to eye and above to procumbent spine at front of spinous dorsal; within its area above eye are 7 to 12 dusky, rounded, well-spaced spots. Iris yellowish to olivaceous. Body with 8 longitudinal gray-blue lines in young; with age increasing to about 15, of which front ones interrupted above pectoral as obliquely vertical lines, while longitudinal lines may be broken, irregular, or even waved in places. Fins all pale or dull uniform brown, paired ones, caudal and anal pale to whitish in young.

East Indies. The coloration changes in many cases with preservation, often the blue lines turning to deep brown bands. Though quite variable in the details of the blue lines the design is quite constant.

8361, 8364. Atulayan Island. June 18, 1909. Length 238 to 248 mm. One example.

Batan Island. June 5, 1909. Length 193 to 265 mm. Two examples.

A582. Busbus Point, Siasi Island. September 20, 1909. Length 243 mm.

15189. Busin Harbor, Burias Island. March 7, 1909. Length 206 mm.

7842. Busin Harbor. March 8, 1909. Length 208 mm.

5630. Busin Harbor. April 22, 1908. Length 300 mm.

9141. Cabugan, Chico Island. July 30, 1909. Length 262 mm.

7870, 7871. Cagayan, Sulu. January 8, 1909. Length 275 to 287 mm. Ground color lemon yellow, probably olivaceous or olive green on back in life. Dark bar through eye from chin to nape. Head above smoky purplish or blackish. Nape and back anteriorly with many small slate blue spots, perhaps brown on ocular bar fading to gray yellow; undulating lines or stripes of blue on back and side posteriorly running more or less longitudinally and above pectoral more or less vertically, breaking into dots about soft dorsal and at caudal base. Breast with obscure purplish lines and reticulations. Fins bright yellow, except ventrals, which whitish.

7798, 7862, 7863. Candaraman Island, Balabac. January 4, 1909. Length 200 to 253 mm.

8026. Capulaan Bay, Leyte. February 24, 1909. Length 260 mm.

13930. Cebu market. April 4, 1908. Length 153 mm.

5380. Cebu market. April 6, 1908. Length 175 mm. Back olive, washed with yellow, latter brighter anteriorly. Seal brown bar from nape through eye to tip of chin, broken into round spots above eye. Cheek and upper part of opercle sulphury yellow, edge of opercle and interopercle white. Forehead and snout above washed with yellow. Side of body marked with numerous waved blue pale lines, more or less parallel to outline except on shoulder, where obliquely vertical for about ⅔ distance of depressed pectoral—above shoulder under spinous dorsal—and as lines of broken roundish spots; somewhat same at caudal base. Iris dusky with some golden. Area before pectoral base and above markedly tinged with orange. Vertical fins like body but more yellowish. Anal base pale. Pectoral hyaline yellow. Ventral soiled white with yellowish wash terminally.

7586. Endeavor Strait, Malampaya Sound, Palawan Island. December 23, 1908. Length 280 mm. Ground color yellowish or bronzed. Bars and vermiculations slaty.

4868. Jolo market. February 13, 1908. Length 232 mm.

7916. Limbones Cove, Luzon. February 8, 1909. Two examples. Length 253 to 255 mm. General color olive yellow, in life bright lemon yellow merging into slate white on lower surfaces. Top and side of head olive yellow. Brown stripe or bar from chin though eye meeting across nape in predorsal, below eye bordered by slaty blue and above dotted with round seal brown spots. On back undulating narrow slate blue lines, these breaking into round dots anteriorly and posteriorly; first reaches from first or second dorsal spine to penultimate; second broken far as seventh dorsal spine, then parallels first stripe; below about 6 others breaking into round spots on caudal peduncle; below these 4 or 5 very waved stripes; on anterior side vertical undulating stripes, about 10 to 12, reaching from second horizontal stripe to about level of lower pectoral base; on lower side above anal base ground color as round yellow spots. Dull orange arc on gill opening before front of pectoral. Vertical fins yellowish near body color, without spots. Pectoral rays bright yellow, membranes hyaline. Ventral pale.

9002. Mactan Cove, Mactan Island. April 6, 1908. Length 141 mm.

15795. Makesi Island, Palawan. April 5, 1909. Length 160 mm.

6158, 6159. Mansalay, Mindanao. June 4, 1908. Length 238 to 255 mm.

20297, 20298. Near Palag Bay, Luzon. June 16, 1909. Length 215 to 238 mm.

7968, 15654. Pagapas Bay, Luzon. February 20, 1909. Length 235 to 244 mm. Generally lemon yellow, brighter posteriorly. Dark brown stripe from nape through eye to chin about width of eye and numerous spots above eye within bar; on fading spots occellate brownish centers and yellow rims. Stripes on body bluish, vertical in suprapectoral region, horizontal above and posterior and breaking into spots more or less on back anteriorly and caudal peduncle. Fins below lemon yellow, membranes slightly hyaline, without spots or bars.

15336. Port Palapag. June 3, 1909. Length 190 mm.

12116 [925]. Port Uson, west of Pinas Island. December 17, 1908. Length 184 mm. Upper surfaces with olive and yellow tints. Vermiculating lines slate. Lower surfaces pale. Fins distinctly yellow.

8782. Quinalasag Island. June 12, 1909. Length 246 mm.

8255. Saboon Island, Ragay Gulf. March 10, 1909. Length 248 mm.

15766. Sacol Island. September 9, 1909. Length 112 mm.

5715. Surigao, Mindanao. May 8, 1908. Length 292 mm.

4962. Tataan Island, Tawi Tawi Group. February 21, 1908. Length 133 mm.

A463. Tulnalutan Island. September 9, 1909. Length 233 mm.

70855. Tutu Bay, Jolo Island. September 19, 1909. Length 92 mm.

A1231, 19795. Gomomo Island. December 3, 1909. Length 98 to 250 mm.

A1145, 9720. Kayoa Island. November 29, 1909. Length 150 to 225 mm.

A954, A955. Sadaa Island. November 17, 1909. Length 266 to 300 mm.

21377. Talisse Island. November 9, 1909. Length 78 mm.

71658 U.S.N.M. Nafa, Okinawa, Riu Kiu. *Albatross* collection, 1906. Length 203 mm. As *Siganus marmoratus*.

SIGANUS VIRGATUS (Valenciennes)

Amphacanthus virgatus VALENCIENNES, Hist. Nat. Poiss., vol. 10, 1835, p. 133. Java.—SCHLEGEL and MÜLLER, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 11, pl. 3, fig. 1 (Buru, Vanikoro, Timor).—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 53 (Singapore); vol. 7, 1854, p. 227 (Macassar); vol. 8, 1855, p. 344 (Duizend Island); vol. 9, 1855, p. 228

(Macassar); vol. 10, 1856, p. 347 (Rio, Bintang); vol. 15, 1858, p. 220 (Biliton), p. 242 (Singapore); vol. 18, 1859, p. 354 (Bawean); vol. 21, 1860, p. 138 (Muntok, Banka); vol. 22, 1860, p. 245 (Batoesendi, Tambelang, Bawean); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 8 (Macassar); vol. 3, No. 5, 1857–58, p. 2 (Macassar); vol. 3, No. 9, 1857–58, p. 4 (Trussan).—KNER, Reise Novara, Fische, 1865, p. 209 (Java and Singapore).—JOUAN, Mém. Soc. Imp. Sci. Nat. Cherbourg, ser. 2, vol. 2, 1866, p. 124 (Poulo-Condor, off Lower Cochin).—MARTENS, Preuss. Exp. Ost-Asien, 1876, p. 394 (Singapore).

Teuthis virgata GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 323 (China and Philippines).—BLEEKER, Verslag. en Mededeel. Kon. Akad. Wet. Amsterdam, vol. 2, ser. 2, 1868, p. 291 (Rio, Bintang).—DAY, Fishes of India, pt. 1, 1875, p. 166, pl. 40, fig. 3 (Andamans).—KÁROLI, Termesz. Füzetek, Budapest, vol. 1, 1881, p. 158 (Singapore).—DAY, Fauna Brit. India, vol. 2, 1889, p. 89.—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 531 (Luzon, Manila, Cavite, Santa Cruz).—ISHIKAWA and MATSUURA, Prelim. Cat. Fish. Mus. Tokyo, 1897, p. 34.

Theutis virgata STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien, vol. 60, Heft 1, 1870, p. 565 (Singapore).—DÜNCKER, Mitt. Naturht. Mus. Hamburg, vol. 21, 1903 (1904). p. 159 (Singapore).

Teuthis virgatus FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. 546 (Padang).

Siganus virgatus JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 562 (copied).—JORDAN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 35 (Panay).—EVERMANN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98 (Bacon).—SEALE and BEAN, Proc. U. S. Nat. Mus., vol. 33, 1907, p. 247 (Zamboanga).—JORDAN and RICHARDSON, Bull. Bur. Fish., vol. 27, 1907 (1908), p. 271 (Cuyo).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 287 (Calapan).

Depth 1¾ to 1⅞; head 3⅓ to 3¾, width 1⅞ to 2. Snout 2⅛ to 2¼ in head; eye 2⅗ to 3¼, 1 to 1½ in snout, 1 to 1¼ in interorbital; teeth about 36 in each jaw; maxillary 3⅔ to 3¾ in head; interorbital 2½ to 2⅞, broadly convex; infraorbitals, preopercle flange, opercle and scapular arch striate. Gill rakers 5+21, short, bifid points.

Scales small, ovoid, cycloid, 50 to 80 circuli. Cheek naked or with a few scattered small scales, often naked in young.

D. XIII, 9, I or 10, I, fifth spine 1⅗ to 1⅔ in head, fourth ray 1¼ to 1⅖; A. VII, 8, I or 9, I, third spine 1⅖ to 1½, third ray 1¼ to 1½; caudal slightly emarginate in young, little more so with age, 2⅞ to 3½ in combined head and body; least depth of caudal peduncle 2⅞ to 4 in head; pectoral 1⅛; ventral 1¼.

Dull brown generally, but little paler below and usually posterior half of body slightly lighter. Iris brownish. Broad dark brown band from predorsal forward to eye and then obliquely to chin, its width equal to eye. Another parallel oblique deep brown band from anterior portion of spinous dorsal down to pectoral axil and then across breast, its width greater than anterior band above though more or less narrowing below; in adults not extending below pectoral base; sometimes upper limits variably narrowed or with undulations; each oblique band with narrow pale marginal line and intervening areas pale or grayish, also area behind posterior band. Over and within dark and pale bands on upper surface of back variable gray to dusky vermiculating or waved lines, though mostly transverse, so that 9 or 10 cross front of body before dorsal in space down to snout, with age about 15. Often a number of dark oblique lines down on preorbital within dark band. Examples often show pale area on lower half of head spotted with brown or in other cases with varied vermiculating bluish or dark gray lines. Often times whole back with pale gray to deep brown spots which extend more or less sparsely on abdomen, in some cases forming variable vertical blue-gray parallel lines over costal region and trunk above. Some examples may show 1 or 2 parallel gray lines on side of thorax before pectoral base. Spinous dorsal and spinous anal brown, often clouded darker, and in adults often large scattered dusky spots on membranes medially to basally. Soft vertical fins often clouded with brownish. Paired fins dull brown.

Andamans, East Indies, Philippines, China.

A very abundant and variable species in the Philippines. It is closely related to *Siganus doliatus*, but differs in a slightly deeper body and less lineated color-pattern. Young examples often show the caudal with 5 or 6 dark cross bands and the soft dorsal and anal with dark cross bands. Although we admit *Siganus doliatus* as distinct, it is with some hesitancy, as we have 3 examples listed under the present species which surely appear intermediate in color-pattern. The largest (12897) has 13 vertical bluish lines which extend well down on the lower sides. The last line is about opposite the base of the fourth anal spine and then 4 or 5 longitudinal lines extend backward on hind part of tail and caudal peduncle. On the right side of the same fish are 20 vertical bluish lines and the last is about opposite front of soft dorsal and the longitudinal lines correspondingly short. The markings on the opercle are reticulations, which are in agreement with Günther's compilation of his *Teuthis doliata*, as he says "those on the operculum reticulated." In the examples we describe as *Siganus doliatus* they may be a little vermiculate below though usually they appear as oblique short bars or lines all inclined from the infraorbital limits toward the edge of the gill opening.

15172. Alibijaban Island, Ragay Gulf, Luzon. March 6, 1909. Length 110 mm.

11200, 13713, 16066. Alimango Bay, Burias Island. March 5, 1909. Length 118 to 165 mm.

19373. Beach near Caiholo, Ulugan Bay. December 29, 1908. Length 60 mm.

9492, 10590, 19767. Bolalo Bay, Palawan Island. Four examples. December 21, 1908. Length 68 to 215 mm.

12204, 14795, 15569, 15570. Bugsuk Island, Balabac. January 5, 1909. Length 85 to 158 mm.

9008, 9009. Busin Harbor, Burias Island. April 22, 1908. Length 161 to 188 mm.

168, 15308. Busin Harbor. March 8, 1909. Length 103 to 152 mm.

9821. Cagayan, Sulu Island. January 8, 1909. Length 200 mm.

14981. Calangaman Island. March 16, 1909. Length 162 mm.

8866 to 8868. Canimo Island. June 15, 1909. Length 228 to 260 mm.

15902. Capulaan Bay, Pagbilao Island. February 24, 1909. Length 185 mm.

13164, 13165. Cataingan Bay, Masbate. April 17, 1908. Length 108 to 111 mm.

One example. Cataingan Bay. April 18, 1908. Length 65 mm.

15271. Canmahala Bay, Ragay Gulf. March 11, 1909. Length 168 mm.

18392. Cebu market. April 4, 1908. Length 103 mm.

17084. Dupon Port, Leyte Island. March 17, 1909. Length 150 mm.

14628. Galvaney Island, Ragay Gulf. March 9, 1909. Length 160 mm.

4594, 4595. Grande Island Reef, Subig Bay. January 8, 1908. Length 168 to 176 mm.

14429. Gubat, Sorsogan, Luzon. June 23, 1909. Length 110 mm.

7444. Guntao Island. December 20, 1908. Length 220 mm.

8763, 8764. Lahuy Island. June 11, 1909. Length 243 to 260 mm.

9013, 9014. Langao Point, Luzon. June 24, 1909. Length 210 to 218 mm.

12808. Little Santa Cruz Island, Zamboanga. May 26, 1908. Length 183 mm.

11132, 19152 [1336]. Lode Bay, Destacado Island. March 13, 1909. Length 168 to 210 mm.

22509 [509]. Mactan Island, Mactan Cove. April 6, 1908. Length 148 mm. Umber bars with more or less reddish shades, borders slate blue. Bands on front of head similar. Center of side with reddish umber wash.

5443, 5445. Maculabo Island. June 14, 1909. Length 180 to 195 mm.

12022, 12125, 12153. Malcochin Harbor, Linapacan Island. December 19, 1908. Length 145 to 203 mm.

20151. Malcochin Harbor. December 18, 1908. Length 45 mm.

4701, 19617. Mansalay, Mindoro. June 4, 1908. Length 38 to 170 mm. Seven examples.

9054. Masbate Reef, Masbate. April 20, 1908. Length 170 mm.

7245. Masinloc Bay, Zambales. March 23, 1908. Length 210 mm.

11207, 11208, 14694. Matnog Bay. May 31, 1909. Length 115 to 155 mm.

15850. Nabatas Point, Samar. July 24, 1909. Length 178 mm.

12761. North end of Endeavor Strait, Palawan. December 22, 1908. Eleven examples. Length 54 to 132 mm.

14291 [1151]. Pagapas Bay. February 20, 1909. Length 173 mm. Large clavate dark-brown blotch from pectoral base across shoulder, sides edged with blue stripes. Head brown, except opercle and darker mark from chin through eye. Other dark-blue marks and spots on head and upper front part of side and back. Spinous dorsal dusky olive, tipped with smoky yellow. Anal tinged bluish. Caudal, upper posterior part of back and most of soft dorsal yellowish.

278. Paluan Bay, Mindoro. December 11, 1908. Length 173 mm.

17868, 17869. Polloc, Mindanao. May 22, 1908. Length 175 to 180 mm.

15926, 22633. Port Banalacan. February 23, 1909. Length 205 to 210 mm.

11253, 14711. Port Caltom. December 15, 1908. Length 150 to 178 mm.

5760, 5761. Port Capunuypugan, Mindanao. May 10, 1908. Length 218 mm.

7766, 14947. Port Ciego, Balabac Island. January 3, 1909. Length 168 to 208 mm.

9181 to 9183, 10364, 10513, 13823, 18694 to 18696. Port Jamelo, Luzon. July 13, 1908. Length 34 to 185 mm. Ten examples.

Three examples. Port Matalvi, Luzon. November 23, 1908. Length 42 to 60 mm.

6889, 6997, 6998. Port San Pio Quinto, Camiguin Island. November 10, 1908. Length 228 to 265 mm.

7045, 7102, 7103. Port San Pio Quinto. November 11, 1908. Length 135 to 262 mm.

19816. Port San Vincente. November 18, 1908. Length 53 mm.

15151. Port Uson, west of Pinas Island. December 17, 1908. Length 150 mm.

7323. Pucot River, Mariveles. January 29, 1909. Length 82 mm.

7059 [448]. Romblon Harbor. March 25, 1908. Length 135 mm. Lemon yellow above, pearl gray to white below; from first dorsal spine through eye to below chin dark bar nearly wide as eye, pale orange brown above, seal brown below eye and black on throat, margined with bluish. Posteriorly white line on head. From below fourth to sixth spines to pectoral base umber bar broader than eye, narrowly margined bluish and obscure dusky line outside. Front portion of back, nape and sides of head with small bluish spots. Front of head crossed by 8 narrow bluish bars, another on premaxillary. Lips dusky. Obscure yellowish stripe under fleshy base of pectoral, orange above. Dorsal lemon yellow, dusky on spinous part. Anal dusky. Caudal lemon yellow with dusky. Paired fins dusky.

14784, 15399, 15633. Sablayan, Mindoro. December 12–13, 1908. Length 138 to 193 mm.

10921. San Miguel Harbor. April 21, 1908. Length 145 mm.

9125. San Roque, Leyte. July 29, 1909. Length 258 mm.

5773, 5774. Sianga Bay. December 12, 1908. Length 200 to 240 mm.

4890. Siasi Island, Masbate. February 17, 1908. Length 240 mm.

6603. Simaluc Sibi Sibi Island. September 23, 1909. Length 100 mm.

5028. South Tumindao Island. February 26, 1908. Length 156 mm.

8399. Surigao, Mindanao. May 8, 1908. Length 30 mm.

15605, 15607. Taganak Island. January 7, 1909. Length 168 to 180 mm.

15606. Taganak Island. August 10, 1909. Length 168 mm.

7368. Tara Island. December 15, 1908. Length 203 mm.

4932, 4933, 4953. Tataan, Tawi Tawi Group. February 20, 1908. Length 198 to 217 mm. Middle of side light reddish-brown, above with lemon yellow over dark olive on back, and lower surfaces shading to drab. From below fourth to sixth dorsal spines dull reddish sepia bar extends obliquely forward, narrowing across front of pectoral base and bordered by dull purplish slate lines. Similar area on nuchal region, crossing eye and ending as band behind chin, limited by narrow slaty blue line from base of third dorsal spine. Back below spinous dorsal with numerous small slate-blue spots, sometimes fused as lines. Series of narrow slaty bars across top of head and snout and 2 similar stripes under eye divide brown stripe into 3 equal parts. Yellow ground of cheek and opercle shows as reticulating lines; 2 or 3 yellow lines from pectoral base toward chin. Iris dark brown. Dorsal dusky lemon yellow, color continued on upper half of caudal peduncle and includes also caudal fin. Anal membranes drab, spines and rays tinged bluish. Pectoral dusky, base pink. Ventral whitish, spines drab.

6440. Tilig, Lubang. July 14, 1908. Length 260 mm.

7677. Ulugan Bay, at island north of Oyster Inlet. December 28, 1908. Thirteen examples. Length 70 to 200 mm.

7702. Ulugan Bay. December 29, 1908. Length 275 mm. Brown ocular and humeral bars. Blue bars across top of head. Blue spots on side of head and anterior portion of back.

18736. 18737. Varadero Bay. July 23, 1908. Length 30 to 167 mm.

6428 to 6430. West coast of Palaui Island. November 18, 1908 Length 180 to 210 mm.

6988. West coast of Sabtan Island. November 8, 1908. Length 245 mm.

A1510. Birabirahan, Borneo. December 31, 1909. Length 215 mm.

A1365. Basa Island, Gulf of Boni, Celebes. December 17, 1909. Two examples. Length 185 to 190 mm. Show very little of vertical bars. Larger with about 6 behind lower portion of shoulder and few obscure waves on middle of lower sides, obscure in smaller examples with entire back and side behind ocular bar spotted with blue, also blue ocular bar crossing cheek more or less broken.

A1386, 13384, 20803. Labuandata Bay, Gulf of Boni, Celebes. December 18, 1909. Length 148 to 210 mm.

17913, 17914, 18111. Tana Keke Island, Celebes. December 21, 1909. Length 120 to 158 mm.

A1346, A1347. Great Tobea Island. December 14, 1909. Three examples. Length 186 to 223 mm.

13581, 14415. Talisse Island. November 9, 1909. Length 75 to 160 mm.

A1406. Tampotana Island. December 21, 1909. Length 220 mm.

12896 to 12898 [2138 to 2140], 13210 to 13215 [2141], 14339. Tobea Island. December 14, 1909. In some throat with blue bars mark lower level of orbit, then break into spots to level of pectoral and above. Only spots behind eighth dorsal spine. All with some spots on opercle.

8410. Hokuho, Soo Wan, Formosa. January 29, 1910. Length 104 mm.

55956 U.S.N.M. Bacon, Philippines. Bureau of Fisheries [3233]. Length 193 mm.

56310 U.S.N.M. Iloilo. G. A. Lung. Two examples. Length 93 to 101 mm.

58052 U.S.N.M. Zamboanga. Dr. E. A. Mearns. August 21, 1906. Two examples. Length 212 to 250 mm.

72701 U.S.N.M. Java. Bryant and Palmer. Length 190 mm.

72702 U.S.N.M. Java. Bryant and Palmer. Length 120 mm.

72703 U.S.N.M. Java. Bryant and Palmer. Length 186 mm.

SIGANUS VULPINUS (Schlegel)

Amphacanthus vulpinus SCHLEGEL, Bijdr. Dierk., vol. 1, 1852, p. 38. East Indies.—SCHLEGEL and MÜLLER, Verh. Nat. Ges. Nederland. Zool., 1839–44, p. 12 (Moluccas, Celebes).—BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 236 (Ternate); vol. 4, 1853, p. 132 (Ternate); vol. 5, 1853, p. 154 (Macassar); vol. 16, 1858, p. 29 (Amboina); Act. Soc. Sci. Ind. Néerland., vol. 1, No. 3, 1856, p. 4 (Manado); vol. 1, No. 5, 1856, p. 75 (Amboina); vol. 2, No. 7, 1857, p. 5 (Amboina); vol. 3, No. 4, 1857–58, p. 3 (Manado).—WEBER, Siboga Exp., vol. 57, Fische, 1913, p. 330 (Gisser).

Teuthis vulpina GÜNTHER, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 324 (Celebes); Journ. Mus. Godeffroy, vol. 2–3, Heft 5–6, 1874, p. 91 (East Indies, Solomons, Pelew Islands).—MEYER, An. Soc. Española, Hist. Nat. Madrid, vol. 14, 1885, p. 22 (Manado and Macassar, Celebes).—ELERA, Cat. Fauna Filipin., vol. 1, 1895, p. 531 (Luzon, Batangas, Manila, Nusugbu).

Siganus vulpinus FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 62, 1922, p. 59 (Zamboanga).

Teuthis tubulosa GRAY, Cat. Fish. Gronow, vol. 2, 1854, p. 142. Indian Ocean.

Lo unimaculatus EVERMANN and SEALE, Bull. Bur. Fish., vol. 26, 1906 (1907), p. 98, fig. 19. Bacon, Philippines.

Depth 2⅛ to 2⅕; head 3 to 3⅖, width 2¼ to 2⅗. Snout 1⅞ to 2⅛ in head; eye 3 to 3⅞, 1⅖ to 2⅕ in snout, 1½ in interorbital, greater than interorbital in young; teeth about 30 in each jaw; maxillary 4 to 5 in head; interorbital 3⅛ to 3¼, broadly and slightly convex; preorbital, preopercle limb, opercle and scapular arch rather finely striate. Gill rakers 4 + 17, short, flexible, spinescent, cuneate points.

Scales very small, ovoid, cycloid, 90 to 140 circuli. Cheek more or less completely covered with small scales to preopercle ridge.

D. XIII, 10, I or 11, I, fifth spine 1¾ to 1⅘ in head, fourth ray 1⅗ to 1¾; A. VII, 9, I or 10, I, third spine 1⅘ to 1⅞, third ray 1¾ to 1⅘; caudal little emarginate or lunate, 1¼ to 1⅖; least depth of caudal peduncle 4¼ to 5; pectoral 1⅓ to 1½; ventral 1⅖ to 1½.

Brown generally, becoming much paler posteriorly and on vertical fins, which quite light. Front of head including upper surface of muzzle and chin up to eye dusky brown, also all of thorax and gill opening; latter pale in very young. Cheek quite white or silvered, very finely dotted deep brown, also upper front of back in old examples. Paired fins brown. Cheek, lower half of head and shoulder girdle uniformly pale in young.

East Indies, Philippines.

Owing to its constricted thorax and produced muzzle this species has been made the type of a distinct genus, *Lo*. It is not otherwise, however, structurally different from the various species included in *Siganus*. *Lo unimaculatus* has been proposed by Evermann and Seale also as a distinct species, though we consider it a synonym of the present, probably a sexual variation. Its distinctive character is the large dark blotch on the lateral line below the front of the soft dorsal or last dorsal spines. This blotch is very variable, even on the same individual, as it may be large on one side of the body and small on the other. When large it may be twice or more size of eye. Sometimes it may be present on one side of the body and absent from the other side. In some cases it is conspicuously smaller than the eye. We list our materials according to the presence or absence of the black blotch.

1. Examples with black lateral blotch below last dorsal spines and front of soft dorsal:

332, 15404 to 15406. Atulayan Island. June 18, 1909. Length 197 to 212 mm.
12247, 12248, 19148. Batan Island. June 5, 1909. Length 180 to 190 mm.
15619. Casogoran, Malhon Island. July 27, 1909. Length 153 mm.
12838. Cebu market. April 6, 1908. Length 180 mm.
8827, 8828. Maculabo Island. June 13, 1909. Length 225 to 230 mm.
15518, 15519. Palag Bay, Luzon. June 16, 1909. Length 180 to 200 mm.
15521, 15522. Pandanon Island. March 24, 1909. Length 208 to 215 mm.
14357, 14358. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 188 to 190 mm.
Two examples. Philippines. Length 180 to 182 mm.
5896. Polloc, Mindanao. May 23, 1908. Length 216 mm.
5758, 5759. Point Capunuypugan, Mindanao. May 10, 1908. Length 210 to 218 mm.

5082. Pujada, Mindanao. May 15, 1908. Length 193 mm.

9242, 12591, 15647. Rapurapu Island. June 22, 1909. Length 125 to 205 mm.

2. Examples without black blotch on back:

16065. Alimango Bay, Burias Island. March 5, 1909. Length 188 mm.

9796. Caxisigan Island, off Balabac. January 2, 1909. Length 137 mm.

9252. Endeavor Strait. December 22, 1908. Length 223 mm.

21535. Endeavor Strait. December 23, 1908. Length 117 mm.

5020. Lagoon South Tumindao. February 26, 1908. Length 205 mm. Dusky cadmium, front part of body, breast and head mainly black. Paler median stripe through top of head from front of dorsal, washed with yellow. From upper preopercle edge across head below, including region between breast and chin, olive gray peppered with small brownish spots. From shoulder downward behind pectoral and ventral paler, becoming silvery to gray below, breast and region in front black. Iris dark. Dorsal body color, exposed edge of spines bluish. Soft verticals dusky. Anal like dorsal. Pectoral dusky, upper edge black. Ventral with first spine and ray blackish, inner spine and rays with yellowish terminally.

6154, 6155. Mansalay, Mindanao. June 4, 1908. Length 195 to 208 mm.

14345. Matnog Bay. March 31, 1909. Length 205 mm.

8354. Murcielagos Bay, Mindanao. August 21, 1909. Length 190 mm.

8210, 15856, 15857. Pagapas Bay, Luzon. February 20, 1909. Length 185 to 200 mm.

14650. Parang, Mindanao. May 23, 1908. Length 188 mm.

14356. Paron Point, Albay Gulf, Luzon. June 21, 1909. Length 190 mm.

5897. Polloc, Mindanao. May 22, 1908. Length 205 mm.

7379, 14710. Port Caltom. December 15, 1908. Length 164 to 207 mm.

6375. Port Jamelo. July 13, 1908. Length 230 mm.

15475, 15476. Port Matalvi, Luzon. November 23, 1908. Length 210 to 214 mm.

15152. Port Uson, west of Pinas Island. December 17, 1908. Length 204 mm.

8252, 8253. Reefs of southern lagoon. February 26, 1908. Length 140 to 163 mm.

14310, 14311. Tara Island. December 14, 1908. Length 150 to 178 mm.

7655, 16384. Ulugan Bay. Channel mouth of inlet. December 28, 1908. Length 200 to 240 mm.

9724. Kayoa Island. November 29, 1909. Length 167 mm.

14944. Talisse Island. November 9, 1909. Length 115 mm.

22859, 22884. Togian Bay, Togian Island. November 19, 1909. Length 90 to 118 mm.

14741. Limbe Strait, Celebes. November 10, 1909. Length 190 mm.

21361. Limbe Strait. November 11, 1909. Length 120 mm.

A1509. Birabirahan Island, Borneo. December 31, 1909. Length 210 mm.

21492 to 21494, 22685, 22686, 22817. Gane Road, Gillolo Island. December 1. 1909. Length 60 to 110 mm.

14682. Tidore Island, south of Ternate. November 24, 1909. Length 192 mm.

A1069. Tidore Island. November 25, 1909. Two examples. Length 189 to 200 mm.

84230 U.S.N.M. Zamboanga. Dr. Fred Baker. Four examples. Length 193 to 230 mm.

INDEX

[The page numbers of the principal entries are set in heavy-faced type. Asterisk indicates page on which illustration is given]

Page

- abhortani, Amphacanthus 323
  - Chaetodon 102
- Acanthinion orbicularis 21
- Acanthocaulis 287
- Acanthochætodon 157
  - annularis 191
  - imperator 189
  - lepidolepis 184
  - nicobariensis 188
  - semicirculatus 185
  - striatus 186
- Acanthopodus 12
  - argenteus 13
  - boddaerti 169
- acanthops, Holacanthus 183
- Acanthure à croissant 231
  - elegant 255
- Acanthurus 207
  - achilles 247
  - aliala 246
  - altivelis 259
  - annularis 212
  - annulatus 272
  - argenteus 207, 222
  - armiger 232
  - aterrimus 243
  - atramentatus 228
  - aureolineatus 220
  - barav 218
  - bariene 222
  - bipunctatus 212
  - bleekeri 220
  - blochi 246
  - blochii 212, 247, 256
  - carinatus 216
  - celebicus 243, 244
  - chrysosoma 214
  - ctenodon 201
  - (Ctenodon) strigosus 201
  - delisiani 243
  - delisianus 243
  - delissianus 243
  - desjardinii 256
  - doreensis 213
  - dussumieri 222, 223
  - eparai 231
  - flavescens 258
  - flavoguttatus 217
  - fuliginosus 211
  - fuscus 243, 244
  - gahhm 234
  - gahm 234
  - gahmoides 234
  - gemmatus 258
  - glaucopareius 246
  - goramensis 259
  - grammoptilus 225

Page

- Acanthurus guntheri 237
  - guttatus 215, 248
  - (Harpurus) velifer 256
    - xanthurus 262
  - hepatus 205
  - hirudo 250
  - humeralis 231
  - hypselopterus 256
  - incipiens 272, 273
  - kaber 246
  - ketlitzi 217
  - leucocheilus 225
  - leucosternon 243
  - lineatus 217
  - lineolatus 228, 229
  - lituratus 278
  - marginatus 214, 272
  - maristarum 256
  - mata 220
  - matae 213
  - matoides 211, 237
  - melanurus 212
  - melas 212
  - metoprosophron 280
  - mindorensis 213
  - niger 237
  - nigricans olivaceus 231
  - nigrofuscus 237
  - nigro-fuscus 237
  - nigroris 213
  - nigros 213
  - nummifer 222
  - olivaceus 231
  - pentazona 250
  - philippinus 215
  - pyroferus 232, 233
  - rasi 237
  - rhombeus 259
  - (Rhombotides) bleekeri 220
    - gahm 234
    - nigrofuscus 237
    - sohal 216
  - rostratus 255, 262
  - rubropunctatus 237
  - ruppelli 256
  - ruppellii 207, 256
  - scalprum 287
  - scopas 255, 259
  - sohal 216
  - striatus 201, 218
  - strigosus 200
  - subarmatus 250
  - suillus 256, 257
  - tennantii 233
  - tennenti 232
  - teuthis 205
  - theuthis 205

Page
Acanthurus triostegus 249
    triostegus var. polyzona 250
        var. sandvicensis 251
    tuberosus 274, 280
    undulatus 219
    unicornis 264
    velifer 255, 256
    viaged 256
    virgatus 259
    vittatus 218
    xanthopterus 212
    xanthurus 262
    zebra 250

Acanthus 255
    nigricanus 234
achilles, Acanthurus 247
    Hepatus 247, 248
    Teuthis 248
Acronurus 207
    aegyptius 266
    argenteus 222
    coringer 266
    lineolatus 222
    melanurus 212
acuminatus, Chaetodon 154
    Chetodon 154
    Heniochus 154
adiergastos, Chaetodon 83, 99, 100
aegyptius, Acronurus 266
aequipinnis, Caesiosoma 8
    Scorpis 7, 8
aetate-varians, Scatophagus 40
africana, Drepane punctata var 28
agana, Zebrasoma 259
Agenor 7
    modestus 7, 8
albipunctatus, Platax 22
albopunctatus, Amphacanthus 297
    Siganus 297
    Teuthis 297, 308, 315, 324
aliala, Acanthurus 246
    Teuthis 246
alternans, Holacanthus 185
altivelis, Acanthurus 259
    Chaetodon 50
    Coradion 49
Amblytoxotes 30
amboinensis, Keris 266, 268
    Norseus 266
    Priodon 266

Amphacanthus 288
    abhortani 323
    albopunctatus 297
    argenteus 319
    aurantiacus 297
    canaliculatus 311
    chrysospilos 313
    chrysospilus 314
    concatenatus 293
    corallinus 301
    cyanotaenia 325
    doliatus 324
    dorsalis 307
    firmamentum 313
    fuscescens 314
    guamensis 321

Page
Amphacanthus guttatus 288, 313
        var. oramin 307
    gymnopareius 323
    hexagonatus 312
    javanus 291
    javus 291
    kopsii 297
    labyrinthodes 299
    lineatus 319
    luridus 319
    maculosus 323
    margaritifer 312
    margaritiferus 297, 312
    marmoratus 320
    melanospilus 313, 314
    mertensii 306
    nebulosus 323
    notostictus 314
    nuchalis 314
    ocularis 325
    olivaceous 323
    oramin 307
    puellus 325
    punctatus 312, 314
    rostratus 310
    russelii 292
    scaroides 321
    sigan 323
    siganus 323
    stellatus 314
    sutor 305
    tetrazona 324
    tumifrons 311
    vermicularis 300
    vermiculatus 299
    virgatus 327
    vulpinus 288, 332
Amphiscarus 288
anagou, Platax 19
Angelichthys 157
anginosus, Keris 263, 265
    Priodon 265
angiosus, Naseus 265, 266
Anisochaetodon 54
annularis, Acanthochaetodon 191
    Acanthurus 212
    Chaetodon 191
    Chetodon 191
    Holacanthus 157, 191
    Priodon 272
    Prionodon 272
annulatus, Acanthurus 272
    Naseus 271
    Naso 271*
    Priodon 263, 271

Antigonia 3
    capros 3
    eos 6
    fowleri 4
    malayana 4
    mulleri 4
    rhomboidea 4
    rubescens 4
    rubicunda 4
    steindachneri 4
aphrodite, Chaetodon 54

Page
Apostasis 200
aquilinus, Hepatus 214
arabica, Chaetodon trifasciatus var. 67
arcuatus, Holacanthus 176
  Pomacanthus 185
argentatus, Chaetodon 129
argentea, Teuthis 319
argenteus, Acanthopodus 13
  Acanthurus 207, 222
  Acronurus 222
  Amphacanthus 319
  Chaetodon 12, 13
  Monodactylus 14
  Psettus 13
  Siganus 319
  Teuthis 222
argus, Cacodoxus 36
  Chaetodon 34, 35
  Chetodon 35
  Ephippus 36
  Scatophagus 35, 37*, 40
armiger, Acanthurus 232
arthriticus, Chaetodon 19
  Platax 19
aruset, Holacanthus 177
asfur, Chaetodon 177
  Chetodon 177
  Holacanthus 177
  Pomacanthus 177
Aspisurus 207
  carolinarum 274
  elegans 263, 279
  unicornis 264
  sohar 207, 216
assarius, Chaetodon 125
aterrimus, Acanthurus 243
  Hepatus 243
atramentatus, Acanthurus 228
  Hepatus 228
  Teuthis 230
atratus, Chaetodon 191
atrimentatus, Teuthis 228
atromaculatus, Chaetodon 36
Atromatoidea layardi 13
Atypichthys 11
  strigatus 11
Atyposoma 10
  gurneyi 10
Atypus 11
  strigatus 11
Aulorhamphus 200
aurantiacus, Amphacanthus 297
aureofasciatus, Chaetodon 92
aureolineatus, Acanthurus 220
aureus, Chaetodon 105
auriga, Chaetodon 53, 54, 116
  Chetodon 116
  Tetragonoptrus (Linophora) 116
auripes, Chaetodon 105
aurolineatus, Siganus 319, 320
aurora, Caprophonus 3, 4
  Chaetodon 134
australis, Doidyxodon 10, 11
  Teuthis 249, 250
  Tilodon 9, 10
austriacus, Chaetodon 66

Page
austriacus, Chaetodon trifasciatus subsp. 67
  var. 66
  Citharodeus 66
Axinurus 263
  thynnoides 263, 285
  vedar 250
barav, Acanthurus 218
bariene, Acanthurus 222
  Hepatus 222, 241
baronessa, Chaetodon 136
  triangulum subsp. 137
  Gonochaetodon 137
batavianus, Platax 19, 21
bataviensis, Platax 19
bella-maris, Chaetodon 97
bellicosus, Chaetodon 106
bellulus, Chaetodon 85
bellus, Chaetodon 67
benhalatute, Hypsinotus 4
bennetti, Chaetodon 73
  frehmli 83
  Coradion 73
  Tetragonoptrus (Rhabdophorus) 74
bennettii, Chaetodon 73
biaculeatus, Monoceros 263, 265
bicolor, Chetodon 172
  Chaetodon 172
  Holacanthus 172
bifascialis, Chaetodon 53, 136
  Megaprotodon 139
bifasciatus, Chaetodon 155
biocellatus, Chaetodon 96
bipunctatus, Acanthurus 212
  Hepatus 230
  Teuthis 212
bishopi, Holacanthus 188
  Teuthis 214
bispinosus, Holacanthus 170, 181, 182, 183
blackburni, Chaetodon 80
blackburnii, Chaetodon 80
bleekeri, Acanthurus 220
  (Rhombotides) 220
  Hepatus 220
  Taurichthys 147
blochi, Acanthurus 246
blochii, Acanthurus 212, 247, 256
  Platax 23
boddaerti, Acanthopodus 169
  Chaetodon 169
boersii, Platax 19
boops, Scorpis 17
bougainvilli, Scatophagus 36
brachycentron, Naseus 268
  Naso 268
Bramichthys 16
  woodwardi 16, 17
brevirostris, Naseus 268
  Naso 268, 269*
  Teuthis 297
brunneus, Buro 288, 305
  Scatophagus 37
Buro 288
  brunneus 288, 305
Buronus 288
Cacodoxus 34
  argus 36

Page
caeruleus, Chaetodon 207
Caesiosoma 7
  aequipinnis 8
  sieboldi 7
Callicanthus 263
      metoposophron 280, 281, 282
canaliculata, Teuthis 311
canaliculatus, Amphacanthus 311
  Chaetodon 288, 311
  Siganus **311**, 312
  Teuthis 312
canescens, Chaetodon 196
  Chetodon 196
  Pomacanthus 196
  Zanclus 198
capistratus, Chaetodon 53
capricornensis, Siganus 299
Caproidae **2**
Caprophonus 3
  aurora 3, 4
Capros **3**
capros, Antigonia **3**
cardiformis, Chaetodon 111
carens, Chaetodon 82
carinatus, Acanthurus 216
carolinarum, Aspisurus 274
carpentariensis, Toxotes 33
caudifasciatus, Chaetodon trifasciatus subsp. 67
caudovittatus, Holacanthus **162**
celebicus, Acanthurus 243, 244
  Hepatus 214, 243
Centrogaster 288
  fuscescens 288
  rhombeus 14
centrognathos, Zanclus 197
centrognathum Gnathocentrum 196
Centropodus 12
  rhombeus 14
Centropyge 156
  tutuilae 181, 182
Ceris 263
Chaetodipterus orbis 26
Chaetodon 48, **53**, 110, 142, 143, 146
  abhortani 102
  acuminatus 154
  adiergastos 83, **99**, 100*
  altivelis 50
  (Anisochaetodon) auriga 116
    larvatus 137
    lineolatus 131
    mertensii 127
    mesoleucus 136
    semilarvatus 130
    triangulum var. karraf 137
    vagabundus var. pictus 121
  annularis 191
  aphrodite 54
  argentatus **129**
  argenteus 12, 13
  argus 34, 35
  arthriticus 19
  asfur 177
  assarius **125**
  atratus 191
  atromaculatus 36
  aureofasciatus **92**
  aureus 105

Page
Chaetodon auriga 53, 54, **116**
    var. setifer 117
  auripes 105
  aurora 134
  austriacus 66
  baronessa 136
  bella-maris 97
  bellicosus 106
  bellulus 85
  bellus 67
  bennetti 73
  bennettii 73
  bicolor 172
  bifascialis 53, 139
  bifasciatus 155
  biocellatus 96
  blackburni 80
  blackburnii **80**
  boddaerti 169
  caeruleus **207**
  canaliculatus 288, 311
  canescens 196
  capistratus 53
  cardiformis 111
  carens 82
  chrysostomus 151
  chrysozonus 48, 49, 99, 101
  chrysurus 127
    subsp. madagaskariensis 127
      paucifasciatus 127
  ciliaris 157
  citrinellus 86
    var. semipunctatus 86
  collare **104**
    var. duplicicollis 105
      duplicollis 105
      knerii 105
  collaris 53, 104, 106
  corallicola 54, **84**
  cornutus 196
  couaga 250
  daedalma **82**
  dahli **110**
  dayi **110**
  decipiens 82
  decoratus 78
  decussatus 121
  diacanthus 169
  dixoni 127
  dizoster 134
  dolosus 85
  dorsalis 102
  dorsiocellatus 97
  dux 169
  elongatus 213
  enceladus 43
  enneacanthus 49
  ephippium 53, 70
  falcatus 28
  falcula **134**
  fallax 84
  fasciatus 97, 99, **130**, 169
  festivus 51
  flavescens 113
  flavirostris 83
  flavus 130
  frehmli bennetti 83

Page
Chaetodon fremblii 83
  fronticornis 263
  gahm 213
  garnoti 71
  garretti 85
  germanus 96
  (Gonochaetodon) triangulum 136
  guntheri 85
  guttatissimus 88, 127
  guttatus 49, 298, 313
  hodjan 136
  howensis 81
  imperator 189
  karraf 137
  kleini 113
  kleinii 113
  klunzingeri 67
  labiatus 49
  larvatus 137
    var, karraf 137
  leachi 140
  leachii 140
  leucopleura 81
  leucopygus 81
  lineatus 217
  lineolatus 54, 130, 132, 133, 135
  lituratus 263
  longimanus 28
  longirostris 45
  luctulosus 80
  lunaris 117
  lunatus 131
  lunula 96, 100, 105, 106, 130
  lunulatus 96
  macrolepidotus 146, 154
  maculatus 88
  maculiceps 77
  maculosus 177
  mantelliger 85
  marginatus 102
  marleyi 92
  (Megaprotodon) strigangulus 139
  melannotus 101
  melanomystax 113
  melanopoma 112
  melanopterus 70
  melanopus 51
  melanotus 101, 102
  melapterus 67, 70
  melastomus 113
  mertensi 127
  mertensii 127
  mesoleucos 136
  mesoleucus 136, 191
  mesomelas 191
  meyeri 53, 60, 61,* 62*
  microlepis 186
  miliaris 85, 88
  mitratus 83
  modestus 84
  mulsanti 71
  multicinctus 89
  mycteryzans 155
  nesogallicus 117
  nicobariensis 188
  nigricans 211, 233, 234, 246

Page
Chaetodon nigripes 86
  nigripinnatus 83
  nigripinnis 83
  nigrofuscus 237
  nigropunctatus 110
  nippon 82
  notophthalmus 91
  nudus 197
  obscurus 110
  ocellatus 51, 84, 97, 111
  ocellicauda 109
  ocellicaudus 109
  ocellifer 82
  ocellipinnis 145, 146
  octofasciatus 93
  octolineatus 94
  oligacanthus 52
  olivaceous 266
  orbicularis 21
  orbis 25
  ornatissimus 61, 63*
    var. kaupi 64
  ornatus 63, 64
  ovalis 67
  oxycephalus 132
  papek 67, 71
  parallelus 105
  pelewensis 96
  pentacanthus 22
  pictus 121
  pinnatus 18
  piratalis 36
  plebeius 77, 78
  plebejus 78
  polylepis 142
  praetextatus 105
  princeps 125
  principalis 71
  punctatofasciatus 89
  punctato-fasciatus 67
  punctato-lineatus 89
  punctatus 26, 27, 86
  punctulatus 85
  quadrimaculatus 88
  rafflesi 50, 125
  rafflesii 125
  rainfordi 93
  reinwardti 101
  resinus 178, 191
  reticulatus 106
  rostratus 42
  sebae 125
  sebanus 117
  selene 108
  semeion 78, 79
  semilarvatus 130
  setifer 70, 116
  setosus 19
  sexfasciatus 145, 146
  sohal 207, 216
  sohar 216
  speciosus 121
  speculum 75
  sphenospilus 111, 112
  spilopleura 76
  stellati 248

Page

- Chaetodon, stellatus 248
  - striatus 40, 53
  - striganguli 139
  - strigangulus 139
  - strigatus 143, 144
  - superbus 106
  - tachete 88
  - tallii 131
  - tau-nigrum 66
  - teira 17, 18
  - terla 28
  - tetracanthus 40
  - (Tetragonoptrus) maculatus 88
    - nigripinnis 83
    - nigropunctatus 110
    - trifasciatus 66
  - townleyi 52
  - triangularis 53, 139
  - triangulum 54, 136, 139
    - subsp. baronessa 137
  - trichrous 84
  - tricinctus 92
  - tricolor 156
  - trifascialis 139
  - trifasciatus 65
    - var. arabica 67
    - subsp. austriacus 67
    - var. austriacus 66
    - subsp. caudifasciatus 67
  - triostegus 249
  - truncatus 45
  - ulietensis 134
    - var. confluens 134
  - unicornis 263, 264
  - unifasciatus 76, 105
  - unimaculatus 53, 110
    - subsp. interruptus 111
  - vagabundus 120
  - vagabundus var. jordani 121
  - vespertilio 22
  - vinctus 74
  - virescens 113
  - viridis 105
  - vittatus 66
  - vorticosus 191
  - wiebeli 97
  - xanthocephalus 82, 83
  - xanthurus 127
  - zanzibarensis 76
  - zoster 142
- Chaetodontidae 40
- Chaetodontoplus 157
  - chrysocephalus 194
  - conspicillatus 194
  - dimidiatus 195
  - duboulayi 194
  - melanosoma 195
- Chaetodontops 53
- chameleon, Scatophagus 37
- chatareus, Coisus 33
  - Toxotes 33
- Chelmo 42, 45
  - longirostris 46
  - marginalis 43
  - mulleri 43, 44
  - pulcher 43, 44

Page

- Chelmo, rostratus 42
  - trochilus 45
  - truncatus 45
- Chelmon 42
  - lol 46
  - longirostris 46
  - marginalis 43, 44
  - mulleri 43
  - rostratus 42, 44, 45
- Chelmonops 46
  - trochilus 45
  - truncatus 45
- Chetodon acuminatus 154
  - annularis 191
  - argus 35
  - asfur 177
  - auriga 116
  - bicolor 172
  - canescens 196
  - collaris 104
  - cornutus 197
  - daakar 19
  - fasciatus 169
  - imperator 189
  - lineatus 217
  - longirostris 46
  - macrolepidotus 154
  - mesoleucos 136
  - orbicularis 21
  - orbis 25
  - rostratus 42
  - unicornis 264
  - unimaculatus 111
  - vagabundus 121
- Choetodon (Tetragonoptrus) kleinii 113
    - nigropunctatus 110
    - xanthurus 127
- chrysocephalus, Chaetodontoplus 194
  - Holacanthus 194
- chrysosoma, Acanthurus 214
  - Hepatus 214
- chrysospilos, Amphacanthus 313
- chrysospilus, Amphacanthus 314
- chrysostoma, Heniochus 151
- chrysostomus, Chaetodon 151
  - Heniochus 151
  - Taurichthys 151
- chrysozonus, Chaetodon 48, 49, 99, 101
  - Coradion 49, 51, 125
- chrysurus, Chaetodon 127
  - Holacanthus 169, 188
- ciliaris, Chaetodon 127
- Citharodeus austriacus 66
- Citharoedus 53
  - collaris 105, 106
  - mertensi 127
  - meyeri 60
  - octofasciatus 94
  - ornatissimus 64
  - speculum 75
  - taunigrum 66
  - triangulum 136
  - unimaculatus 111
  - vittatus 66
- citrinellus Chaetodon 86

Page
citrinellus var. semipunctatus, Chaetodon 86
  Tetragonoptrus 86
cocher, Deprane 151
coerulescens, Holacanthus 177
coeruleus, Holacanthus 185
Coisus chatareus 33
collare, Chaetodon 104
collaris, Chaetodon 53, 104, 106
  Citharoedus 105, 106
  Tetragonoptrus 105
   (Chaetodontops) 105
Colocopus 205
  lambdurus 205
commersonii, Psettus 13
concatenatus, Amphacanthus 293
  Siganus 293, 297, 301
  Teuthis 293
confluens, Chaetodon ulietensis var 134
consobrinus, Siganus 323, 324
conspicillatus, Chaetodontoplus 194
  Holacanthus 194
   (Chaetodontoplus) 194
Coradion 48
  altivelis 49
  bennetti 73
  chrysozonus 49, 51, 125
  desmotes 51
  melanopus 51, 140
  modestus 84
corallicola, Chaetodon 54, 84
corallina, Teuthis 302
corallinus, Amphacanthus 301
  Siganus 294, 301, 302
  Teuthis 302
coringer, Acronurus 266
cornutus, Chaetodon 196
  Chetodon 197
  Zanclus 197
couaga, Chaetodon 250
croissant, Acanthure à 231
Cryptosmilia 26
  luna 26, 28
Ctenochaetus 200
  striatus 201, 202
  strigosus 200, 201, 238
Ctenodon 207
  ctenodon 201
  lineatus 217
  ruppellii 207
ctenodon, Acanthurus 201
  Ctenodon 201
cyanotaenia, Amphacanthus 325
cyanotis, Holacanthus 172
Cyphomycter 2, 273
daakar, Chetodon 19
daedalma, Chaetodon 82
dahli, Chaetodon 110
darwiniensis, Holacanthus 194
dayi, Chaetodon 110
decipiens, Chaetodon 82
decoratus, Chaetodon 78
decussatus, Chaetodon 121
delisiani, Acanthurus 243
delisianus, Acanthurus 243
delissianus, Acanthurus 243
desjardinii, Acanthurus 256

Page
Desmoprenes 2, 40
desmotes, Coradion 51
diacanthus, Chaetodon 169
  Holacanthus 169, 170*, 181
dimidiatus, Chaetodontoplus 195
  Holacanthus 195
Diphreutes 146
  macrolepidotus 155
diphreutes, Heniochus 155
Ditrema, violacea 9
  violaceus 7
dixoni, Chaetodon 127
dizoster, Chaetodon 134
Doidyxodon 10
  australis 10, 11
doliata, Teuthis 324, 329
doliatus, Amphacanthus 324
  Siganus 324, 329
dolosus, Chaetodon 84
doreensis, Acanthurus 213
  Hepatus 213
dorsalis, Amphacanthus 307
  Chaetodon 102
  Teuthis 308
dorsiocellatus, Chaetodon 97
Douwing formose 188
Drepane 25, 26
  cocher 151
  longimana 28
  punctata var 27
   africana 28
   longimana 28
   octofasciata 28
  punctatus 28
Drepanichthys 26
drepanoides, Heniochus 151
duboulayi, Chaetodontoplus 194
  Holacanthus 194
duplicicollis, Chaetodon collare var 105
duplicollis, Chaetodon collare var 105
dussumieri, Acanthurus 222, 223
  Hepatus 222, 246
dux, Chaetodon 169
  Holacanthus 169
ecornis, Monoceros 278
ehrenbergii, Platax 22
elegans, Aspisures 263, 279
elegant, Acanthure 255
elevatus, Zeus 259
elongatus, Chaetodon 213
  Hepatus 213, 228, 230
  Teuthis 228, 230
enceladus, Chaetodon 43
Enixe 26
enneacanthus, Chaetodon 49
eos, Antigonia 6
eoume, Naso 272, 273, 275, 277*
  Prionurus 275
eparai, Acanthurus 231
Ephippidae 24
ephippium, Chaetodon 53, 70
  Rabdophorus 71
  Tetragonoptrus (Rabdophorus) 71
Ephippus 25
  argus 36
  melanopus 26

Page
Ephippus, multifasciatus 40
orbis 25
terla 28
tetracanthus 40
Eteira 53
taunayi 140
triangularis 139
Etroplus, formosus 287
excelsa, Loa 146, 149, 150
falcatus, Chaetodon 28
falciformis, Monodactylus 12, 13
Psettus 13
falcipinnis, Psettus 13
falcula, Chaetodon 134
Pomacentrus 134
Tetragonoptrus (Oxychaetodon) 134
fallax, Chaetodon 84
fasciatus, Chaetodon 97, 99, 130, 169
Chetodon 169
Harpurus 250
Scatophagus 40
Tetragonoptrus (Chaetodontops) 97, 130
festivus, Chaetodon 51
filamentosus, Pomacentrus 117
firmamentum, Amphacanthus 313
fisher, Holacanthus 157, 183
flava, Teuthis 319, 320
flavesceus, Acanthurus 258
Chaetodon 113
Zebrasoma 258, 262
flavirostris, Chaetodon 83
flavissimus, Forcipiger 46, 47, 48
Holacanthus 172
flavoguttatus, Acanthurus 217
Hepatus 217
flavo-niger Holacanthus 60
flavus, Chaetodon 103
Forcipiger 45
flavissimus 46, 47, 48
longirostris 45, 46, 47*
formose, Douwing 188
formosus, Etroplus 287
forsteni, Holacanthus 169
forsteri, Holacanthus 169
fowleri, Antigonia 4
fremblii, Chaetodon 83
fronticornis, Chaetodon 263
Naseus 265
Naso 263, 265
fuliginosus, Acanthurus 211
Hepatus 211, 213
fuscescens, Amphacanthus 314
Centrogaster 288
Siganus 310, 311, 314, 315, 319
Sparus 314
Teuthis 315
fuscus, Acanthurus 243, 244
Naseus fronticornis 263
Platax 19
Siganus 288, 302
gahhm, Acanthurus 234
gahm, Acanthurus 234
(Rhombotides) 234
Chaetodon 213
gahmoides, Acanthurus 234
gaimardi, Platax 22

Page
gampret, Platax 19
garnoti, Chaetodon 71
garretti, Chaetodon 85
Monoceros 279
gemmatum, Zebrasoma 258
gemmatus, Acanthurus 258
Genicanthus 156
lamarckii 161
genimarginatus, Naso 282
geometricus, Holacanthus 188
georgianus, Scorpis 7, 9
germanus, Chaetodon 96
gibbosus, Teuthis 302, 303
glaucopareius, Acanthurus 246
Harpurus 246
Hepatus 246
Gnathocentrum 196
centrognathum 196
gnophodes, Harpurus 220, 221, 222
Gonochaetodon 54
baronessa 137
triangulum 136
Gonopterus 196
moerens 197
morens 196
goramensis, Acanthurus 259
grammoptilus, Acanthurus 225
Hepatus 225, 241
Teuthis 225
guamensis, Amphacanthus 321
guntheri, Acanthurus 237
Chaetodon 85
Hepatus 212
gurneyi, Atyposoma 10
guttatissimus, Chaetodon 88, 127
guttatus, Acanthurus 215, 248
Amphacanthus 288, 313
Chaetodon 49, 298, 313
Harpurus 248
Hepatus 248
Siganus 294, 297, 313
Teuthis 313
guttulatus, Platax 23
gymnopareius, Amphacanthus 323
haddaja, Holacanthus 177
Harpochirus 26
longimanus 28
punctatus 28
Harpurina 2, 253
Harpurus 207, 253
fasciatus 250
glaucopareius 246
gnophodes 220, 221, 222
guttatus 248
inermis 312
lineatus 217
lituratus 278
nigricans 234, 246
paroticus 231
rhombeus 259
Helotosoma 11
servus 11
Hemichaetodon 53
Hemiochus varius 147
Hemitaurichthys 142, 143
polylepis 142

Page

- Hemitaurichthys, thompsoni 143
  - zoster 142, 143
- Henioche 146
- Heniochus 146
  - acuminatus 154
  - chrysostoma 151
  - chrysostomus 151
  - diphreutes 155
  - drepanoides 151
  - intermedius 155
  - macrolepidotus 150, 154
  - melanistion 151
  - monoceros 149
  - permutatus 151
  - pleurotania 147
  - singularius 152
  - (Taurichthys) varius 147
  - varius 147, 149
- Hepatidae 199
- hepatus, Acanthurus 205
  - Teuthis 205, 207
- Hepatus 2, 205, 207, 253
  - achilles 247, 248
  - aquilinus 214
  - aterrimus 243
  - atramentatus 228
  - bariene 222, 241
  - bleekeri 220
  - bipunctatus 230
  - celebicus 214, 243
  - chrysosoma 214
  - doreensis 213
  - dussumieri 222, 246
  - elongatus 213, 228, 230
  - flavoguttatus 217
  - fuliginosus 211, 213
  - glaucopareius 246
  - grammoptilus 225, 241
  - guntheri 212
  - guttatus 248
  - leucoparius 214
  - leucosternon 243, 245*
  - lineatus 217, 218*
  - lineolatus 228, 253
  - maculiceps 240, 242*
  - marginatus 214
  - mata 213
  - matoides 212, 246, 247
  - mindorensis 213
  - nigricans 228, 230, 233
  - nigrofuscus 223, 237, 241
  - nubilis 2
  - nubilus 253, 254
  - olivaceus 231
  - philippinus 215*
  - pyroferus 232
  - sandvicensis 251
  - sohal 216, 226
  - thompsoni 213
  - triostegus 248, 250, 252
  - umbra 245
  - undulatus 219
  - weberi 237
  - xanthopterus 222, 225
- hexacanthus, Naseus 280
  - Naso 270, 281*

Page

- hexacanthus, Priodon 280
- hexagonata, Siganus 313
  - Teuthis 313
- hexagonatus, Amphacanthus 312
- hirudo, Acanthurus 250
- hodjan, Chaetodon 136
- hoedtii, Naseus 269
- Holacanthus 156, 157
  - acanthops 183
  - alternans 185
    - var. meleagris 186
  - annularis 157, 191
  - arcuatus 176
  - aruset 177
  - asfur 177
  - bicolor 172
  - bishopi 188
  - bispinosus 170, 191, 182, 183
  - caudovittatus 162
  - (Chaetodontoplus) conspicillatus 194
    - personifer 194
  - chrysocephalus 194
  - chrysurus 169, 188
  - coerulescens 177
  - coeruleus 185
  - conspicillatus 194
  - cyanotis 172
  - darwiniensis 194
  - diacanthus 169, 170*, 181
  - dimidiatus 195
  - duboulayi 194
  - dux 169
  - fisheri 157, 183
  - flavissimus 172
  - flavo-niger 60
  - forsteri 169
  - geometricus 188
  - haddaja 177
  - iburu 186
  - ignatius 184
  - imperator 61, 189, 191
  - lamarck 156, 161, 162, 163
  - lamarcki 161
  - lamarckii 161
  - lepidolepis 184
  - leucopleura 174
  - lineatus 177
  - loriculus 179
  - luteolus 172
  - maculosus 177
  - marianus 189
  - melanosoma 195
  - melanospilus 162
  - mesoleucos 136
  - mesoleucus 191, 194
  - mokhella 177
  - monophthalmus 172
  - multifasciatus 179
  - multispinis 183
  - navarchus 167
  - nicobariensis 186*, 188
    - var. semicirculatus 185
  - nox 175
  - ocularis 172
  - poecilus 184
  - potteri 182, 183

Page

- Holacanthus, pseudannularis 191
  - rhomboides 187
  - ronin 193
  - semicircularis 185
  - semicirculatus **185**, 186*
  - septentrionalis 157, 191, **193**
  - sexstriatus **177**
  - somervillii 183
  - sphynx 172
  - striatus 186
  - tenigab 173
  - tibicen 156, **174**
  - tricolor 173
  - trimaculatus **166**
  - vroliki **164**
  - vrolikii 164
  - xanthometopon **163**
  - xanthurus 169
- howensis, Chaetodon **81**
- humeralis, Acanthurus 231
- hypselopterum, Zebrasoma 256, 257
- hypselopterus, Acanthurus 256
- Hypsinotus 3, 4
  - benhalatute 4
  - rubescens 3, 4
- iburus, Holacanthus 186
- ignatius, Holacanthus 184
- Ilarches 25
  - orbis 25
- imperator, Acanthochaetodon 189
  - Chaetodon 189
  - Holacanthus 61, **189**, 191
- incipiens, Acanthurus 272, 273
- inermis, Harpurus 312
- intermedius, Heniochus 155
- interruptus, Chaetodon unimaculatus subsp. 111
- jaculatar, Toxotes 31
- jaculator, Labrus 30
  - Toxotes **30, 32, 33**
- jaculatrix, Sciaena 30
  - Toxotes 31
- japonicus, Platax vespertilio 19
- java, Teuthis 291
  - Theutis 291
- javanus, Amphacanthus 291
- javus, Amphacanthus 291
  - Siganus **291**
  - Teuthis 288, 291
  - Theutis 291
- jordani, Chaetodon vagabundus var 121
- kaber, Acanthurus 246
- karraf, Chaetodon 137
  - (Anisochaetodon) triangulum var 137
    - larvatus var 137
- kaupi, Chaetodon ornatissimus var 64
- Keris 263
  - amboinensis 266
  - anginosus 263, 265
- ketlitzi, Acanthurus 217
- kleini, Chaetodon 113
  - Tetragonoptrus 113
    - (Lepidochaetodon) 113
- kleinii, Chaetodon **113**
  - Choetodon (Tetragonoptrus) 113
- klunzingeri, Chaetodon 67
- knerii, Chaetodon collare var 105

Page

- kopsii, Amphacanthus 297
  - Siganus **297**
  - Teuthis 297
- labiatus, Chaetodon 49
- Labrus, ejaculator 30
- labyrinthodes, Amphacanthus 299
  - Siganus **299**
  - Teuthis **299**
- Laephichthys 255, 262
- lamarck, Holacanthus 156, **161**, 162, 163
- lamarcki, Holacanthus 161
- lamarckii, Genicanthus 161
  - Holacanthus 161
- lambdurus, Colocopus 205
  - Paracanthurus 205
- larvatus, Chaetodon 137
  - (Anisochaetodon) 137
  - Osteochromis 54, 82
- layardi, Stromatoidea 12, 13
- leachi, Chaetodon 140
- leachii, Chaetodon 140
  - Megaprotodon 140
- Lepidochaetodon 53
- lepidolepis, Acanthochaetodon **184**
  - Holacanthus **184**
- Leptotichthys 7
- leschenaldi, Platax 19
- leschenaulti, Platax 19
- leucocheilus, Acanthurus 225
- leucopareius, Hepatus **214**
  - Teuthis 214
- leucopleura, Chaetodon 81
  - Holacanthus 174
- leucopygus, Chaetodon 81
- leucosternon, Acanthurus 243
  - Hepatus **243**, 245*
- lineata, Teuthis 320
- lineatus, Acanthurus 217
  - Amphacanthus 319
  - Chaetodon 217
  - Chetodon **217**
  - Ctenodon **217**
  - Harpurus **217**
  - Hepatus **217**, 218*
  - Holacanthus 177
  - Rhombotides 217
  - Siganus 294, 296, 319, 320
- lineolatus, Acanthurus 228, 229
  - Acronurus 222
  - Chaetodon 54, **130**, 132, 133, 135
    - (Anisochaetodon) 131
  - Hepatus 228, 253
  - Scorpis **8**
  - Tetragonoptrus (Oxychaetodon) **131**, 132
- Linophora **53**
- lithophilus, Scorpis 8
- lituratus, Acanthurus 178
  - Chaetodon 263
  - Harpurus 278
  - Naseus 278
    - (Aspisurus) 279
  - Naso 278, 279
- Lo 262, 288, 333
  - unimaculatus 332, 333
- Loa 146
  - excelsa 146, 149, 150

Page

- lol, Chelmon 46
- longicornis, Naseus 266
- longimana, Drepane 28
  - punctata var., Drepane 28
- longimanus, Chaetodon 28
  - Harpochirus 28
- longirostris, Chaetodon 45
  - Chelmo 46
  - Chelmon 46
  - Chetodon 46
  - Forcipiger 45, 46, 47*
  - Prognathodes 46
- lopezi, Naso 282
- lorentzi, Toxotes 33
- loriculus, Holacanthus 179
- louti, Variola 195
- luctulosus, Chaetodon 80
- luna, Cryptosmilia 26, 28
- lunaris, Chaetodon 117
- lunatus, Chaetodon 131
- lunula, Chaetodon 96, 100, 105, 106, 130
  - Pomacentrus 96
- lunulatus, Chaetodon 96
- luridus, Amphacanthus 319
  - Siganus 319
  - Teuthis 319
- luteolus, Holacanthus 172
- macrolepidotus, Chaetodon 146, 154
  - Chetodon 154
  - Diphreutes 155
  - Heniochus 150, 154
  - Taurichthys 155
- macronotus, Scatophagus 36
- maculatus, Chaetodon 88
    - (Tetragonoptrus) 88
  - Sargus 36
- maculiceps, Chaetodon 77
  - Hepatus 240, 242*
  - Megaprotodon 77
- maculosus, Amphacanthus 323
  - Chaetodon 177
  - Holacanthus 177
- madagaskariensis, Chaetodon chrysurus subsp. 127
- malaccensis, Toxotes jaculator 33
- malayana, Antigonia 4
- mantelliger, Chaetodon 85
- margaritifer, Amphacanthus 312
- margaritifera, Teuthis 305, 312
  - Theutis 312
- margaritiferus, Amphacanthus 297, 312
- marginalis, Chelmo 43
  - Chelmon 43, 44
- marginatus, Acanthurus 214, 272
  - Chaetodon 102
  - Hepatus 214
  - Nascus 272
  - Naso 272
  - Platax 19
- marianus, Holacanthus 189
- maristarum, Acanthurus 256
- marleyi, Chaetodon 92
- marmorata, Teuthis 321
- marmoratus, Amphacanthus 320
  - Siganus 321, 325, 327
- mata, Acanthurus 213, 220

Page

- mata, Hepatus 213
  - Teuthis 220, 222
- matoides, Acanthurus 211, 237
  - Hepatus 212, 246, 247
  - Rhombotides 211
  - Teuthis 228, 230
- Medialuna 6
- Megaprotodon 53
  - bifascialis 139
  - leachii 140
  - maculiceps 77
  - strigangulus 51, 139
  - trifascialis 139
- melanistion, Heniochus 151
- melannotus, Chaetodon 101
- melanomystax, Chaetodon 113
- melanopoma, Chaetodon 112
- melanopterus, Chaetodon 70
- melanopus, Chaetodon 51
  - Coradion 51, 140
  - Ephippus 26
- melanosoma, Chaetodontoplus 195
  - Holacanthus 195
  - Platax 19
- melanospilus, Amphacanthus 313, 314
  - Holacanthus 162
- melanotus, Chaetodon 101, 102
  - Tetragonoptrus (Chaetodontops) 102
- melanurus, Acanthurus 212
  - Acronurus 212
- melapterus, Chaetodon 67, 70
- melas, Acanthurus 212
- melastomus, Chaetodon 113
- meleagris, Holacanthus alternans var 186
- mertensi, Chaetodon 127
  - Citharoedus 127
  - Tetragonoptrus (Linophora) 127
- mertensii, Amphacanthus 307
  - Chaetodon 126
    - (Anisochaetodon) 127
- mesoleucos, Chaetodon 136
  - Holacanthus 136
- mesoleucus, Chaetodon 136, 191
    - (Anisochaetodon) 136
  - Chaetodontops 191
  - Holacanthus 191, 194
- mesomelas, Chaetodon 191
- Metaponichthys 3
- metoposophron, Callicanthus 280, 281, 282
- metoprosophron, Acanthurus 280
- meyeri, Chaetodon 53, 60, 61*, 62*
  - Citharoedus 60
  - Tetragonoptrus (Citharoedus) 65
- Microcanthus 143, 140
  - strigatus 144*
- microlepidotus, Prionurus 287
  - Taurichthys 155
- microlepis, Chaetodon 186
  - Toxotes 33
- miliaris, Chaetodon 85, 88
  - Choetodon (Tetragonoptrus) 85
  - Tetragonoptrus (Tetragonoptrus) 85
- mindorensis, Acanthurus 213
  - Hepatus 213
- mitratus, Chaetodon 83
- modestus, Agenor 7, 8

Page

- modestus, Chaetodon 84
  - Coradion 84
- moerens, Gonopterus 197
- mokhella, Holacanthus 177
- Monoceros 263
  - biaculeatus 263, 265
  - ecornis 279
  - garrettii 279
  - raii 265
  - tuberosus 274
  - unicornis 265
- monoceros, Harpurus 266
  - Heniochus 149
  - Taurichthys 149
- Monodactylidae 12
- Monodactylus 12
  - argenteus 14
  - falciformis 12, 13
  - rhombeus 14
- monophthalmus, Holacanthus 172
- montrouzieri, Zanclus 197
- morens, Gonopterus 196
- mulleri, Antigonia 4
  - Chelmo 43, 44
  - Chelmon 43
- multicinctus, Chaetodon 89
- multifasciatus, Ephippus 40
  - Holacanthus 179
  - Scatophagus 40
- mulsanti, Chaetodon 71
- multispinis, Holacanthus 183
- mycteryzans, Chaetodon 155
- Naseus 263
  - amboinensis 266, 268
  - anginosus 265, 266
  - annulatus 271
  - (Aspisurus) lituratus 279
    - vomer 282
  - brachycentron 268
  - brevirostris 268
  - fronticornis 265
    - fuscus 263
  - hexacanthus 280
  - hoedtii 269
  - lituratus 278
  - longicornis 266
  - marginatus 272
  - olivaceous 266
  - punctulatus 274, 286
  - punikar 266
  - strigatus 256
  - tapeinosoma 283
  - thynnoides 285
  - tonganus 274
  - tripeltis 287
  - tuber 274
  - tuberosus 273, 276
  - unicornis 264
  - vlamingii 275
  - vomer 282
- Naso 2, 263
  - annulatus 271*
  - brachycentron 268
  - brevirostris 268, 269*
  - eoume 272, 273, 275, 277*
  - fronticornis 263, 265

Page

- Naso gemimarginatus 282
  - hexacanthus 280, 281*
  - lituratus 278, 279
  - lopezi 282
  - marginatus 272
  - olivaceus 286
  - punctulatus 286
  - tapeinosoma 283, 284*
  - thynnoides 285*
  - tripeltes 287
  - tuberosus 273, 274*
  - unicornis 264, 265*, 268, 270
  - vlamingii 276
  - vomer 282, 283*
- Nasonus 263
- navarchus, Holacanthus 167
- Neatypus 11
  - obliquus 11, 12
- nebulosa, Teuthis 323
- nebulosus, Amphacanthus 323
  - Siganus 319, 323
- Neochaetodon 143
  - vittatus 144
- Neptotichthys violaceus 9
- nesogallicus, Chaetodon 117
- nicobariensis, Acanthochaetodon 188
  - Chaetodon 188
  - Holacanthus 186*, 188
- niger, Acanthurus 237
- nigricans, Chaetodon 211, 233, 234, 246
  - Harpurus 234, 246
  - Hepatus 228, 230, 233
- nigricanus, Acanthurus 234
- nigripes, Chaetodon 86
- nigripinnatus, Chaetodon 83
- nigripinnis, Chaetodon 83
  - (Tetragonoptrus) 83
- nigrofuscus, Acanthurus 237
  - (Rhombotides) 237
  - Chaetodon 237
  - Hepatus 223, 237, 241
  - Teuthis 212, 237
- nigro-fuscus, Acanthurus 237
- nigromaculatus, Teuthis 297
- nigropunctatus, Chaetodon 110
  - (Tetragonoptrus) 110
- nigroris, Acanthurus 213
- nigros, Acanthurus 213
- nippon, Chaetodon 82
- notophthalmus, Chaetodon 91
- notosticta, Teuthis 314
- notostictus, Amphacanthus 314
  - Siganus 314
- novemaculeatus, Platax 21
- nox, Holacanthus 175
- nubilis, Hepatus 2
- nubilus, Hepatus 253, 254*
- nuchalis, Amphacanthus 314
- nudus, Chaetodon 197
- nummifer, Acanthurus 222
- obliquus, Neatypus 11, 12
- oblungus, Scorpis 9
- obscurus, Chaetodon 110
- occellatus, Chaetodon 97
- ocellatus, Chaetodon 51, 84, 97, 111
  - Parachaetodon 51

Page
ocellatus, Platax 51
ocellicauda, Chaetodon 109
ocellicaudus, Chaetodon 109
ocellifer, Chaetodon 82
ocellipinnis, Chaetodon 145, 146
  Vinculum 146
octofasciata, Drepane punctata 28
octofasciatus, Chaetodon 93
  Citharoedus 93
  Tetragonoptrus (Tetragonoptrus) 93
octolineatus, Chaetodon 93
ocularis, Amphacanthus 325
  Holacanthus 172
oligacanthus, Chaetodon 52
  Tetragonoptrus 52
oligolepis, Toxotes 32
oligostictus, Teuthis 310
olivaceous, Amphacanthus 323
  Chaetodon 266
  Naseus 266
olivaceus, Acanthurus 231
    nigricans 231
  Hepatus 231
  Naso 286
oramin, Amphacanthus 307
    guttatus var 307
  Siganus 307, 316, 319
  Teuthis 307, 308
orbicularis, Acanthinion 21
  Chaetodon 21
  Chetodon 21
  Platax 19, 21
  Psettus 13
orbis, Chaetodipterus 26
  Chaetodon 25
  Ephippus 25
  Harches 25
ornatissimus, Chaetodon 61, 63*
  Citharoedus 64
  Tetragonoptrus (Citharoedus) 64
ornatus, Chaetodon 63, 64
  Scatophagus 36
osseus, Tholichthys 53
Osteochromis 54
  larvatus 54, 82
ovalis, Chaetodon 67
oxycephalus, Chaetodon 132
Oxychaetodon 54
papek, Chaetodon 67, 71
Paracanthurus 205
  lambdurus 205
  theuthis 205, 206*
Parachaetodon 51
  ocellatus 51
Paracoradion 145
parallelus, Chaetodon 105
Parapsettus 6
Parascorpis 10
  typus 10
paroticus, Harpurus 231
paucifasciatus, Chaetodon chrysurus subsp. 127
pelewensis, Chaetodon 96
pentacanthus, Chaetodon 22
  Platax 22
pentazona, Acanthurus 250
permutatus, Heniochus 151

Page
personifer, Holacanthus (Chaetodontoplus) 194
philippinus, Acanthurus 215
  Hepatus 215*
pictus, Chaetodon 121
    (Anisochaetodon) vagabundus var. 121
pinnatus, Chaetodon 18
  Platax 18, 21
piratalis, Chaetodon 36
Platacidae 17
Platax 17
  albipunctatus 22
  anagou 19
  arthriticus 19
  batavianus 19, 21
  bataviensis 19
  blochii 23
  boersii 19
  ehrenbergii 22
  fuscus 19
  gaimardi 22
  gampret 19
  guttulatus 23
  leschenaldi 19
  leschenaulti 19
  marginatus 19
  melanosoma 19
  novemaculeatus 21
  ocellatus 51
  orbicularis 19, 21
  pentacanthus 22
  pinnatus 18, 21
  punctulatus 19
  raynaldi 22
  teira 18, 23, 24
  vespertilio 19, 22
    japonicus 19
  xanthopus 19
plebeius, Chaetodon 77, 78
plebejus, Chaetodon 78
pleurotania, Heniochus 147
poecilus, Holacanthus 184
polylepis, Chaetodon 142
  Hemitaurichthys 142
polyzona, Acanthurus triostegus var. 250
Pomacanthus arcuatus 185
  asfur 177
  canescens 196
Pomacentrus falcula 134
  filamentosus 117
  lunula 96
potteri, Holacanthus 182, 183
praetextatus, Chaetodon 105
Prenes 34
princeps, Chaetodon 125
principalis, Chaetodon 71
Priodon 263
  amboinensis 266
  anginosus 265
  annularis 272
  annulatus 263, 271
  hexacanthus 280
  tapeinosoma 284
Priodontichthys 263
Prionodon annularis 272
Prionurus 287
  eoume 275

Page
Prionurus, microlepidotus 287
  punctatus 287
  punikar 266
  scalprum 287
Proantigonia 3
Prognathodes longirostris 46
Psettias 12
Psettus 12
  argenteus **13**
  commersonii 13
  falciformis 13
  falcipinnis 13
  orbicularis 13
  rhombus 14
  sebae 12
pseudannularis, Holacanthus 191
puella, Teuthis 325
puellus, Amphacanthus 325
  Siganus **325**
pulcher, Chelmo 43, 44
punctata, Drepane 27
punctatissimus, Siganus 2, **298**
punctatofasciatus, Chaetodon 89
punctato-fasciatus, Chaetodon 67, 89
punctatus, Amphacanthus 312, 314
  Chaetodon 26, 27, 86
  Drepane 28
  Harpochirus 28
  Prionurus 287
  Siganus 310, 311, 312
punctulatus, Chaetodon 85
  Naseus 274, 286
  Naso 286
  Platax 19
punikar, Naseus 266
  Prionurus 266
purpurascens, Scatophagus 36
pyroferus, Acanthurus 232, 233
  Hepatus **232**
quadranus, Scatophagus 36
quadrimaculatus, Chaetodon 88
Rabdophorus 53
  ephippium 71
rafflesi, Chaetodon 50, 125
  Tetragonoptrus (Linophora) 125
rafflesii, Chaetodon **125**
raü, Monoceros 265
rainfordi, Chaetodon 93
rasi, Acanthurus 237
raynaldi, Platax 22
reinwardti, Chaetodon **101**
resinus, Chaetodon 178, 191
reticulatus, Chaetodon **106**
rhombeum, Zebrasoma 259
rhombeus, Acanthurus 259
  Centrogaster 14
  Centropodus 14
  Harpurus 259
  Monodactylus 15
  Psettus 14
  Scomber 12, 14
rhomboidea, Antigonia 4
rhomboides, Holacanthus 187
Rhombotides 207
  lineatus 217
  matoides 211
  triostegus 250

Page
richardsonii, Scorpis 8
rivulatus, Scarus 288, 323
  Siganus **323**
Roa 146
ronin, Holacanthus 193
rostrata, Teuthis 310
rostratum, Zebrasoma 259, 262
rostratus, Acanthurus 255, 262
  Amphacanthus 310
  Chaetodon 42
  Chelmo 42
  Chelmon 42, 44, 46
  Chetodon 42
  Siganus **310**, 319, 321, 323
rubescens, Antigonia 4
  Hypsinotus 3, 4
rubicunda, Antigonia 4
rubropunctatus, Acanthurus 237
ruppelii, Zebrasoma 258
ruppellii, Acanthurus 207, 256
  Ctenodon 207
russelii, Amphacanthus 292
ruthiae, Zanclus 197
sandvicensis, Acanthurus triostegus var 251
  Hepatus 251
Sargus maculatus 36
Sarothrodus 53
scalaripinnis, Schuettea 16, **17**
scalprum, Acanthurus 287
  Prionurus 287
  Xesurus 287
scaroides, Amphacanthus 321
Scarus rivulatus 288, 323
  schlosseri 31
  siganus 288, 323
  stellatus 314
Scatophaga 34
Scatophagidae **34**
Scatophagus 2, 34, 40
  aetate-varians 40
  argus 35, 37*, 40
  bougainvillii 36
  brunneus 37
  chameleon 37
  fasciatus 40
  macronotus 36
  multifasciatus 40
  ornatus 36
  purpurescens 36
  quadranus 36
  semistrigatus 40
  tetracanthus **40**
schlosseri, Scarus 31
Schuettea **16**
  scalaripinnis 16, **17**
Sciaena jaculatrix 30
Scomber rhombeus 12, 14
Scopas 255
scopas, Acanthurus 255, 259
Scorpidae 6
Scorpis 7
  aequipinnis 7, 8
  boops 17
  georgianus 7, **9**
  lineolatus **8**
  lithophilus **8**
  oblungus **9**

Page

- Scorpis, richardsonii 8
  - violaceus 9
- sebae, Chaetodon 125
  - Psettus 12
- sebanus, Chaetodon 117
- selene, Chaetodon 108
  - Tetragonoptrus (Chaetodontops) 108
- semeion, Chaetodon 78, 79
  - Tetragonoptrus (Rabdophorus) 79
- semicircularis, Holacanthus 185
- semicularis, Acanthochaetodon 185
  - Holacanthus 185, 186
    - nicobariensis, var 185
- semilarvatus, Chaetodon 130
    - (Anisochaetodon) 130
- semipunctatus, Chaetodon citrinellus var 86
- semistrigatus, Scatophagus 40
- septentrionalis, Holacanthus 157, 191, 193
- servus, Helotosoma 11
- setifer, Chaetodon 70, 116
    - auriga var 117
- setosus, Chaetodon 19
- sexfasciatum, Vinculum 146
- sexfasciatus, Chaetodon 145, 146
  - Holacanthus 177
  - Vinculum 146
- shortlandensis, Siganus 300
- sieboldi, Caesiosoma 7
- sigan, Amphacanthus 323
  - Teuthis 323
- sigana, Teuthis 323
- Siganidae 288
- Siganites 288
- Siganus 262, 288, 333
  - albopunctatus 297
- siganus, Amphacanthus 323
  - Scarus 288, 323
- Siganus argenteus 319
  - aurolineatus 319, 320
  - canaliculatus 311, 312
  - capricornensis 299
  - concatenatus 293, 297, 301
  - consobrinus 323, 324
  - corallinus 294, 301, 302
  - doliatus 324, 329
  - fuscescens 310, 311, 312, 314, 315, 319
  - fuscus 288, 302
  - guttatus 294, 297, 313
  - hexagonata 313
  - javus 291
  - kopsii 297
  - labyrinthodes 299
  - lineatus 294, 296, 319, 320
  - luridus 319
  - marmoratus 321, 325, 327
  - nebulosus 319, 323
  - notostictus 314
  - oramin 307, 316, 319
  - puellus 325
  - punctatissimus 2, 298*
  - punctatus 310, 311, 312
  - rivulatus 323
  - rostratus 310, 319, 321, 323
  - shortlandensis 300
  - spinus 320
  - stellatus 314

Page

- Siganus, striolatus 322
  - sutor 305
  - tetrazona 324
  - tetrazonus 321, 323, 324
  - tumifrons 311
  - vermiculatus 294, 296, 299, 300
  - virgatus 325, 327, 328
  - vulpinus 332
  - zoniceps 325
- singularius, Heniochus 152
- sohal, Acanthurus 216
    - (Rhombotides) 216
  - Chaetodon 207, 216
  - Hepatus 216, 226
- sohar, Aspisurus 207, 216
  - Chaetodon 216
- somervillii, Holacanthus 183
- Sparus fuscescens 314
  - spinus 320
- speciosus, Chaetodon 121
- speculum, Chaetodon 75
  - Citharoedus 75
  - Tetragonoptrus (Rabdophorus) 75
- sphenospilus, Chaetodon 111, 112
- sphynx, Holacanthus 172
- spilopleura, Chaetodon 76
- spinus, Siganus 320
  - Sparus 320
- squamosus, Toxotes 30, 34
- steindachneri, Antigonia 4
- stellata, Teuthis 314
  - Theutis 314
- stellati, Chaetodonton 248
- stellatus, Amphacanthus 314
  - Chaetodon 248
  - Scarus 314
  - Siganus 314
- striatus, Acanthochaetodon 186
  - Acanthurus 201, 218
  - Chaetodon 40, 53
  - Ctenochaetus 201, 202
  - Holacanthus 186
  - Teuthis 201
- striganguli, Chaetodon 139
- strigangulus, Chaetodon 139
  - Chaetodon (Megaprotodon) 139
  - Megaprotodon 51, 139
- strigatus, Atypichthys 11
  - Atypus 11
  - Chaetodon 143, 144
  - Microcanthus 144*
  - Naseus 256
- strigosus, Acanthurus 200
    - (Ctenodon) 201
  - Ctenochaetus 200, 201, 238
- striolata, Teuthis 321
- striolatus, Siganus 322
- Stromatoidea 12
  - layardi 12
- studeri, Teuthis 302
- subarmatus, Acanthurus 250
- suillus, Acanthurus 256, 257
- superbus, Chaetodon 106
- sutor, Amphacanthus 305
  - Siganus 305
  - Teuthis 305

Page
tachete, Chaetodon 88
tallii, Chaetodon 131
tapeinosoma, Naseus 283
  Naso 283, 284*
  Priodon 284
taunayi, Eteira 140
tau-nigrum, Chaetodon 66
taunigrum, Citharoedus 66
Taurichthys 146
  bleekeri 147
  chrysostomus 151
  macrolepidotus 155
  monoceros 149
  varius 146–147
  viridis 147
teira, Chaetodon 17, 18
  Platax 18, 23, 24
tennantii, Acanthurus 233
tennenti, Acanthurus 232
tenigab, Holacanthus 173
terla, Chaetodon 8
  Ephippus 28
tetracanthus, Chaetodon 40
  Ephippus 40
  Scatophagus 40
Tetragonoptrus 53
  (Chaetodontops) collaris 105
    fasciatus 97, 130
    melanotus 102
    selene 108
  (Citharoedus) meyeri 60
    ornatissimus 64
  citrinellus 86
  collaris 105
  (Gonochaetodon) triangulum 136
  kleini 113
  (Lepidochaetodon) kleini 113
    unimaculatus 111
  (Linophora) auriga 116
    mertensi 127
    rafflesi 125
    vagabundus 121
    xanthurus 127
  oligacanthus 52
  (Oxychaetodon) falcula 134
    lineolatus 131, 132
  (Rabdophorus) bennetti 74
    ephippium 71
    semeion 79
    speculum 75
  (Tetragonoptrus) miliaris 85
    octofasciatus 94
    trifasciatus 66
  vittatus 66
tetrazona, Amphacanthus 324
  Siganus 321, 323, 324
  Teuthis 324
tetrazonus, Siganus 324
Teuthis 207
teutlus, Acanthurus 205
Teuthis achilles 248
  albopunctatus 297, 308, 315, 324
  aliala 246
  argentea 319
  argenteus 222
  atramentatus 230

Page
Teuthis, atrimentatus 228
  australis 249, 250
  bipunctatus 212
  bishopi 214
  brevirostris 297
  canaliculata 311
  canaliculatus 312
  concatenatus 293
  corallina 302
  corallinus 302
  doliata 324, 329
  dorsalis 308
  elongatus 228, 230
  flava 319, 320
  fuscescens 315
  gibbosus 302, 303
  grammoptilus 225
  guttatus 313
  hepatus 205, 207
  hexagonata 313
  java 291
  javus 288, 291
  kopsii 297
  labyrinthodes 299
  leucopareius 214
  lineata 320
  luridus 319
  margaritifera 305, 312
  marmorata 321
  mata 220, 222
  matoides 228, 230
  nebulosa 323
  nigrofuscus 212, 237
  nigromaculatus 297
  notosticta 314
  oligostictus 310
  oramin 307, 308
  puella 325
  rostrata 310
  sigan 323
  sigana 323
  stellata 314
  striatus 201
  striolata 321
  studeri 302
  sutor 305
  tetrazona 324
  teuthopsis 302, 303
  triostegus 250
  troughtoni 251
  tubulosa 332
  tumifrons 311
  umbra 214
  vermiculata 300
  vermiculatus 300
  virgata 328
  virgatus 328
  vitianus 310
  vulpina 332
teuthopsis, Teuthis 302, 303
Therapaina 143
theuthis, Acanthurus 205
  Paracanthurus 205, 206*
Theutis 207
  java 291
  javus 291

Page
Theutis margaritifera 312
  stellata 314
  virgata 328
Theutys 207
Tholichthys 41, 52, 53, 54, 99, 120
  osseus 53
thompsoni, Hemitaurichthys 143
  Hepatus 213
thynnoides, Axinurus 263, 285
  Naseus 285
  Naso 285*
tibicen, Holacanthus 156, 174
Tifia 54
Tilodon 9
  australis 9, 10
tonganus, Naseus 274
Toxotes 30
  carpentariensis 33
  chatareus 33
  jaculatar 31
  jaculator 30, 32, 33
    malaccensis 33
  jaculatrix 31
  lorentzi 33
  microlepis 33
  oligolepis 32
  squamosus 30, 34
Toxotidae 29
townleyi, Chaetodon 52
triangularis, Chaetodon 53, 139
  Eteira 139
triangulum, Chaetodon 54, 136, 139
    (Gonochaetodon) 136
  Citharoedus 136
  Gonochaetodon 136
  Tetragonoptrus (Gonochaetodon) 136
trichrous, Chaetodon 84
tricinctus, Chaetodon 92
tricolor, Chaetodon 156
  Holacanthus 173
trifascialis, Chaetodon 139
  Megaprotodon 139
trifasciatus, Chaetodon 65
    (Tetragonoptrus) 66
  Tetragonoptrus (Tetragonoptrus) 66
trimaculatus, Holacanthus 166
triostegus, Acanthurus 249
  Chaetodon 249
  Hepatus 249, 250, 252
  Rhombotides 250
  Teuthis 250
tripeltes, Naso 287
tripeltis, Naseus 287
trochilus, Chelmo 45
  Chelmonops 45
Trompe 30
troughtoni, Teuthis 251
truncatus, Chaetodon 45
  Chelmo 45
  Chelmonops 45
tuber, Naseus 274
tuberosus, Acanthurus 274, 280
  Monoceros 274
  Naseus 273, 276
  Naso 273, 274*
tubulosa, Teuthis 332

Page
tumifrons, Amphacanthus 311
  Siganus 311
  Teuthis 311
tutuilae, Centropyge 181, 182
typus, Parascorpis 10
ulietensis, Chaetodon 134
umbra, Hepatus 245
  Teuthis 214
undulatus, Acanthurus 219
  Hepatus 219
unicornis, Acanthurus 264
  Aspisurus 264
  Chaetodon 263, 264
  Chetodon 264
  Monoceros 264
  Naseus 265
  Naso 264, 265*, 268, 270
unifasciatus, Chaetodon 76, 105
unimaculatus, Chaetodon 53, 110
  Chetodon 111
  Citharoedus 111
  Lo 332, 333
  Tetragonoptrus (Lepidochaetodon) 111
vagabundus, Chaetodon 120
  Chetodon 121
  Tetragonoptrus (Linophora) 121
Variola louti 195
varius, Heniochus 147, 149
    (Taurichthys) 147
  Taurichthys 146, 147
vedar, Axinurus 250
velifer, Acanthurus 255, 256
    (Harpurus) 256
veliferum, Zebrasoma 255, 256, 257, 258, 259
vermicularis, Amphacanthus 300
vermiculata, Teuthis 300
vermiculatus, Amphacanthus 299
  Siganus 294, 296, 299, 300
  Teuthis 300
vespertilio, Chaetodon 22
  Platax 19, 22
viaged, Acanthurus 256
vinctus, Chaetodon 74
Vinculum 145
  ocellipinnis 146
  sexfasciatum 146
  sexfasciatus 146
violacea, Ditrema 9
violaceus, Ditrema 7
  Neptotichthys 9
  Scorpis 9
virescens, Chaetodon 113
virgata, Teuthis 328
  Theutis 328
virgatus, Acanthurus 259
  Amphacanthus 327
  Siganus 325, 327, 328
  Teuthis 328
viridis, Chaetodon 105
  Taurichthys 147
vitianus, Teuthis 310
vittatus, Acanthurus 266
  Chaetodon 81
  Citharoedus 66
  Neochaetodon 144
  Tetragonoptrus 66

Page
vlamingii, Naseus 275
Naso 276
vomer, Naseus 282
(Aspisurus) 282
Naso 282, 283*
vorticosus, Chaetodon 191
vroliki, Holacanthus 164
vrolikii, Holacanthus 164
vulpina, Teuthis 332
vulpinus, Amphacanthus 288, 332
Siganus 332
weberi, Hepatus 237
wiebeli, Chaetodon 97
woodwardi, Bramichthys 16, 17
xanthocephalus, Chaetodon 82, 83
xanthometopon, Holacanthus 163
xanthopterus, Acanthurus 212
Hepatus 222, 225
xanthopus, Platax 19
xanthurum, Zebrasoma 262
xanthurus, Acanthurus 262
(Harpurus) 262
Chaetodon 127
(Tetragonoptrus) 127
Holacanthus 169
Tetragonoptrus (Linophora) 127

Page
Xesurus 287
scalprum 287
Xiphypops 157
Zanclidae 195
Zanclus 196
canescens 196, 198
centrognathos 197
cornutus 197
montrouzieri 197
ruthiae 197
zanzibarensis, Chaetodon 76
zebra, Acanthurus 250
Zebrasoma 255, 262
agana 259
flavescens 258, 262
gemmatum 258
hypselopterum 256, 257
rhombeum 259
rostratum 259, 262
ruppelii 258
veliferum 255, 256, 257, 258, 259
xanthurum 262
Zeus elevatus 259
zoniceps, Siganus 325
zoster, Chaetodon 142
Hemitaurichthys 142, 143

○

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01421 1643